FINAL ENVIRONMENTAL IMPACT STATEMENT September 1993

DISPOSAL AND REUSE OF WURTSMITH AIR FORCE BASE, MICHIGAN

Air Force
Environmental Planning Division
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16 Jul 93

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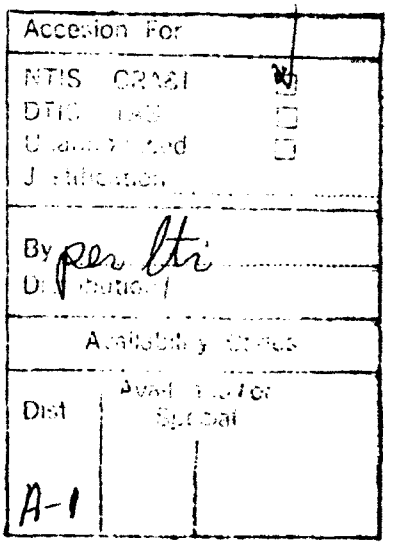
FINAL

ENVIRONMENTAL IMPACT STATEMENT

DISPOSAL AND REUSE OF WURTSMITH AIR FORCE BASE, MICHIGAN

SEPTEMBER 1993



COVER SHEET

FINAL ENVIRONMENTAL IMPACT STATEMENT
DISPOSAL AND REUSE OF WURTSMITH AIR FORCE BASE, MICHIGAN

a. Responsible Agency: U.S. Air Force

b. Cooperating Agency: Federal Aviation Administration

c. Proposed Action: Disposal and Reuse of Wurtsmith Air Force Base (AFB), Iosco County, Michigan

d. Inquiries on this document may be directed to: Lt Col. Gary Baumgartel, Chief of Environmental Planning Division, AFCEE/ESE, 8106 Chennault Road, Brooks Air Force Base, Texas, 78235-5318, (210) 536-3869

e. Designation: Final Environmental Impact Statement (FEIS)

f. Abstract: Pursuant to the Defense Base Closure and Realignment Act, Wurtsmith AFB was closed in June 1993. This EIS has been prepared in accordance with the National Environmental Policy Act to analyze the potential environmental consequences of the disposal and reasonable alternatives for reuse of the base. The document includes analyses of community setting, land use and aesthetics, transportation, utilities, hazardous materials/wastes, soils and geology, water resources, air quality, noise, biological resources, and cultural resources. Three reuse alternatives were examined: a Proposed Action that features aircraft maintenance and refurbishing and general aviation uses of the runway; a Fire Training Alternative that proposes using half of the base for a regional fire training academy; and a Recreation Alternative that would retain more than 90 percent of the base for public facilities/recreational land uses. All alternatives also include mixed industrial, commercial, and residential uses. A No-Action Alternative, which would entail no reuse of the base property, was also evaluated.

Environmental impacts associated with the Proposed Action could include minor transportation, air quality, and noise effects. Appropriate management procedures would have to be implemented for use and handling of hazardous materials and wastes. Fire training activities associated with the Fire Training Alternative could result in effects to transportation, soils, water resources, air quality, and biological resources. Use of proper planning and implementation of appropriate management procedures for the use and handling of hazardous materials associated with fire training activities would minimize these effects. Controlled burning in the forested area in the northwestern part of the base could have beneficial effects on forest habitat. Environmental impacts associated with the Recreation Alternative would be related to traffic volumes and the disturbance and aesthetic effects of demolition of over half of the on-base facilities. These effects could be minimized with the implementation of appropriate planning techniques. The reduction in human activity could result in beneficial effects to biological resources. There would be no adverse effects from the No-Action Alternative, and possible beneficial effects to biological resources from the reduction in human activity.

Because the Air Force is disposing of the property, some of the mitigation measures are beyond the control of the Air Force. Remediation of hazardous waste sites under the Installation Restoration Program is and will continue to be the responsibility of the Air Force.

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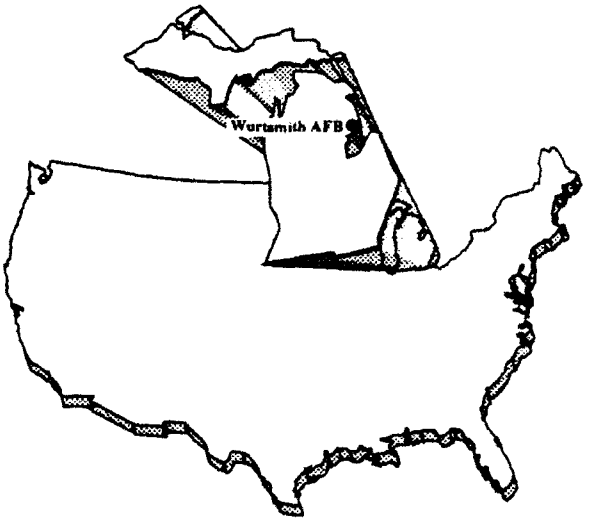


SUMMARY

SUMMARY

PURPOSE OF AND NEED FOR ACTION

Wurtsmith Air Force Base (AFB), Michigan, was one of the bases recommended for closure by the 1991 Defense Base Closure and Realignment Commission. The Commission's recommendations were accepted by the President and submitted to Congress on July 12, 1991. As Congress did not disapprove the recommendations in the time given under the Defense Base Closure and Realignment Act (DBCRA) of 1990 (Public Law 101-510, Title XXIX), the recommendations have become law. Wurtsmith AFB was closed on June 30, 1993.

The Air Force is required to comply with the National Environmental Policy Act (NEPA) in the implementation of the base disposal and reuse. The Air Force must now make a series of interrelated decisions concerning the disposition of base property. This environmental impact statement (EIS) has been prepared to provide information on the potential environmental impacts resulting from disposal and proposed reuse of the base property. Several alternative reuse concepts are studied to identify the range of potential direct and indirect environmental consequences of disposal.

After completion and consideration of this EIS, the Air Force will prepare decision documents stating what property is excess and surplus, and the terms and conditions under which the dispositions will be made. These decisions may affect the environment by influencing the nature of the future use of the property.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

The land within the Wurtsmith AFB boundary encompasses 4,626 acres, including the airfield, aviation support, industrial, institutional (medical), commercial, residential, and public facilities/recreational areas. The Air Force has fee simple (unconditional) ownership of approximately 42 percent of the lands within the base boundary. The remaining 58 percent has been leased or permitted for Air Force use for a limited duration. The Air Force must terminate or surrender its limited rights to the 58 percent of base property when the property is no longer needed for military purposes and after the Air Force has fulfilled its legal obligations pursuant to the leases and permits. The remaining 42 percent (Air Force fee-owned property) will be available for disposal for reuse. Because the Air Force decision on whether and how to dispose of the Air Force fee-owned property may influence how the other 58 percent of base property will be reused, the EIS analyzes the environmental effects of the overall reuse of all of the base property. The Proposed Action and alternatives evaluated in this EIS consider all of the area within the base boundary.

Proposed Action. For the purpose of evaluating potential environmental impacts resulting from the reuse of this land, the Air Force has based its Proposed Action on the community's reuse plan, presented by the Wurtsmith Area Economic Adjustment Commission (WAEAC). The Proposed Action is a comprehensive plan for redevelopment of the base for aviation-related, industrial, commercial, residential, and recreational/tourism uses. It is planned to reuse the airfield and aviation support areas for maintenance and refurbishing of commercial aircraft and related activities. The existing Weapons Storage Area (WSA), alert area, and industrial areas on base would be redeveloped for light industrial uses. A convention center complex would be developed in the existing community center area on base, and commercial areas in the main base area would be retained for similar uses. The base hospital would be used as a medical/dental clinic. Most existing family housing would be retained for residential uses, including retirement and seasonal use, and a recreational vehicle park would be developed in the public facilities/recreation area next to the residential area. Existing open space and public facilities/recreation areas, including the large forested area in the northwestern part of the base, would be retained mostly in an undeveloped state for public recreational uses.

The following alternatives to the Proposed Action are being considered:

- **Fire Training Alternative.** The Fire Training Alternative features use of the northwestern portion of the base by the Great Lakes Fire Training Academy as a comprehensive regional fire training center. Facilities in the WSA and alert area would be used for laboratories, classrooms, administration, and housing; fire fighting training activities would be conducted on the runway, operational area, and taxiways. In addition, occasional forest fire training activities would be conducted, in conjunction with the U.S. Forest Service and Michigan Department of Natural Resources (MDNR), in the existing grenade launching and explosive ordnance disposal (EOD) areas and surrounding forest in the northwestern part of the base. Industrial, commercial, and educational uses would be developed in the main base area, and 855 family housing units in the existing residential area would be retained for permanent, seasonal, and retirement housing. This alternative includes buffer areas designated for public facilities/recreational uses around the fire training area to separate it from the other uses.

- **Recreation Alternative.** The Recreation Alternative designates extensive areas on base for restoration and conservation of open space suitable for a variety of active and passive recreational opportunities, consonant with the recreational/tourism character of the region. More than one-half of the existing structures on base would be demolished or placed in low-maintenance status. The WSA, alert area, and existing industrial areas in the main base area would be redeveloped for light industrial use; other

facilities in the main base area would be developed for a variety of commercial and institutional uses. All but 95 residential units would be demolished to create open space and public facilities/recreation areas.

- **No-Action Alternative.** The No-Action Alternative would leave the base property in caretaker status with no reuse.

Other Land Use Concepts. One other land use concept has been identified that involves only a small portion of the property available for disposal and, therefore, could be implemented in conjunction with the Proposed Action or any of the alternatives under consideration. The Great Lakes and Mid-Atlantic Hazardous Substance Research Center (GLMAC) is proposing to establish an Advanced Environmental Technology Facility for research and development of bioremediation techniques at contaminated sites on Wurtsmith AFB.

SCOPE OF STUDY

The Notice of Intent (NOI) to prepare an EIS for the disposal and reuse of Wurtsmith AFB was published in the *Federal Register* on October 9, 1991. Issues related to the disposal and reuse of Wurtsmith AFB were identified during a subsequent scoping period. A public scoping meeting was held on November 7, 1991, in Oscoda High School, Oscoda, Michigan. The comments and concerns expressed at that meeting and in written correspondence received by the Air Force, as well as information from other sources, were used to determine the scope and direction of studies and analyses required to accomplish this EIS.

This EIS discusses the potential environmental impacts associated with the Proposed Action and reasonable alternatives. In order to establish the context in which these environmental impacts may occur, potential changes in population and employment, land use and aesthetics, transportation, and community and public utility services are discussed as reuse-related influencing factors. Issues related to current and future management of hazardous materials and wastes are also discussed. Potential impacts to the physical and natural environment are evaluated for soils and geology, water resources, air quality, noise, biological resources, and cultural resources. These impacts may occur as a direct result of disposal and reuse actions or as an indirect result of changes to the local communities.

The baseline against which the Proposed Action and alternatives are analyzed consists of the conditions projected at base closure in June 1993, and conditions under the No-Action Alternative projected for the years 1998, 2003, and 2013. In addition, a reference to preclosure conditions is provided in several sections (e.g., air quality and noise) to allow a comparative analysis over time. This will assist the Air Force decision-maker, and other agencies that may be making decisions relating to reuse of

Wurtsmith AFB, in understanding potential long-term trends in comparison to historic conditions when the installation was active.

The Air Force has also prepared a separate Socioeconomic Impact Analysis Study (SIAS) on the potential economic impacts expected in the region as a result of the closure, disposal, and reuse of Wurtsmith AFB. That document, although not required by NEPA, will assist the local community in planning for the transition of the base from military to civilian use. The EIS uses population and employment projections from the SIAS to support the analysis of potential environmental impacts to biophysical resources.

SUMMARY OF ENVIRONMENTAL IMPACTS

This EIS considers potential environmental impacts of the Air Force's disposal of the installation and portrays a variety of potential land uses to cover reasonable future uses of the property and facilities by others. Several alternative scenarios, including the community's proposed plan, were used to group reasonable land uses and to examine the reasonably foreseeable environmental effects of likely reuses of Wurtsmith AFB.

Potential environmental impacts of the Proposed Action and reasonable alternatives are briefly described below. Influencing factors include projections of the reuse activities that would likely influence the biophysical environment, including ground disturbance, socioeconomic factors, and infrastructure demands, and are summarized in Table S-1. Projected employment and population trends are depicted in Figures S-1 and S-2. Potential impacts of the Proposed Action and reasonable alternatives over the 20-year study period are summarized in Table S-2.

Mitigations and Pollution Prevention. Options of mitigating potential environmental impacts that might result from the Air Force disposing of property or from the implementation of the Proposed Action or alternatives by property recipients are presented and discussed. Since most potential environmental impacts would result directly from the reuse by others, the Air Force would not typically be responsible for implementing such mitigations. Full responsibility for these suggested mitigations, therefore, would be borne primarily by future property recipients or local governmental agencies. Mitigation suggestions, where appropriate, are listed in terms of their potential effectiveness if implemented for affected resource areas and are summarized along with the environmental impacts of the Proposed Action and alternatives in Table S-2.

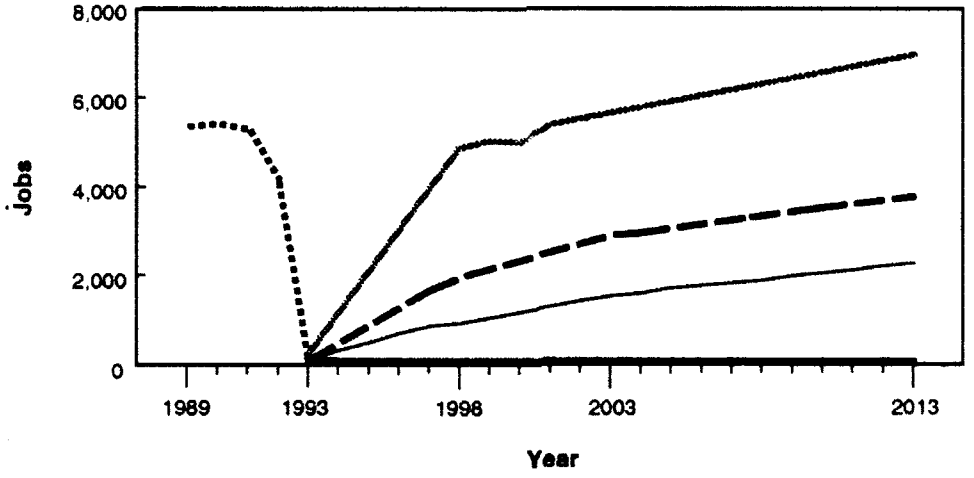
Table S-1. Summary of Reuse-Related Influencing Factors[a]

Factor	Proposed Action			Fire Training Alternative			Recreation Alternative			No-Action Alternative[b]
	1998	2003	2013	1998	2003	2013	1998	2003	2013	
Ground disturbance (acres by phase)	430	87	34	162	87	102	464	17	133	0
Aircraft operations (annual)	16,644	18,792	22,630	0	0	0	0	0	0	0
Direct employment	2,938	3,461	4,285	1,308	1,876	2,498	572	979	1,473	0
Local transfers	1,658	1,930	2,323	512	821	1,071	245	423	640	0
New jobs	185	216	259	58	92	120	28	48	72	0
Secondary employment	1,843	2,146	2,582	570	913	1,191	273	471	712	0
Local transfers	1,461	1,711	2,123	645	925	1,236	266	468	715	0
New jobs	1,477	1,750	2,162	663	951	1,262	306	511	758	0
Population increase	5,002	6,203	8,352	2,148	3,275	4,749	977	1,736	2,835	0
Traffic (total daily trips)	17,000	25,600	29,600	16,900	21,900	26,100	12,700	16,600	21,000	0
Increase in water demand (MGD)	0.48	0.60	0.81	0.21	0.32	0.46	0.10	0.17	0.28	0
Increase in wastewater production (MGD)	0.40	0.50	0.67	0.17	0.26	0.38	0.08	0.14	0.23	0
Increase in solid waste (tons/day)	9.6	11.9	16.0	4.2	6.3	9.2	1.9	3.4	5.5	0
Increase in electricity demand (MWH/day)	48.3	60.0	80.5	20.9	31.8	46.0	9.7	17.1	27.4	0
Increase in natural gas demand (thousand therms/day)	6.9	8.5	11.4	3.0	4.5	6.5	1.4	2.5	3.9	0

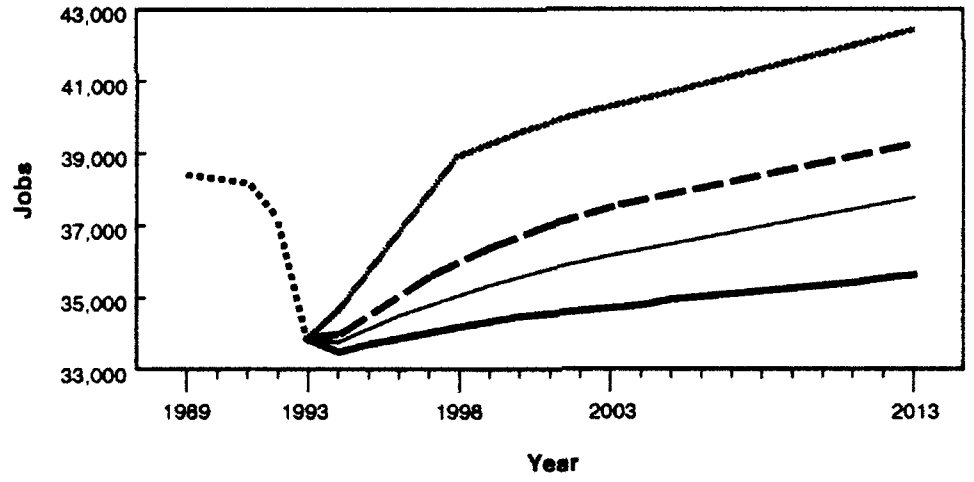
Notes: (a) Values shown represent change from projected No-Action Alternative conditions in each year as a result of implementing that alternative.
(b) The No-Action Alternative values summarize influencing factors relative to the projected closure conditions for each period of analysis.
MGD = million gallons/day.
MWH = megawatt hours.

ALTERNATIVE	1993[a]	1998	2003	2013
Proposed Action	61	4,781	5,607	6,867
Fire Training	61	1,878	2,789	3,689
Recreation	61	845	1,450	2,185
No-Action	61	0	0	0

Reuse-Related Employment Effects



Reuse-Related Employment Effects[b]



Total Employment Including Reuse Effects

EXPLANATION

- Preclosure
- Proposed Action
- Fire Training Alternative
- Recreation Alternative
- No-Action Alternative

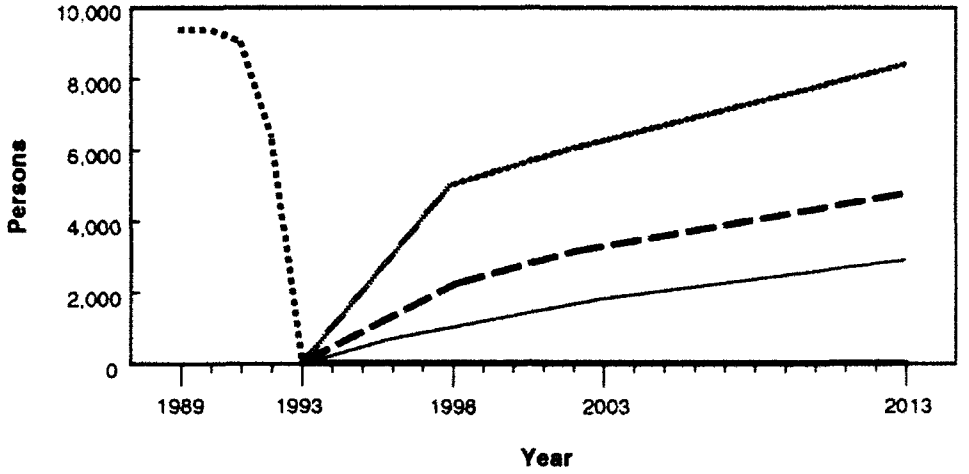
Reuse-Related Employment Effects

(a) The 1993 values represent total base-related employment under the closure baseline.
(b) Employment effects represent the change in employment relative to the No-Action Alternative.

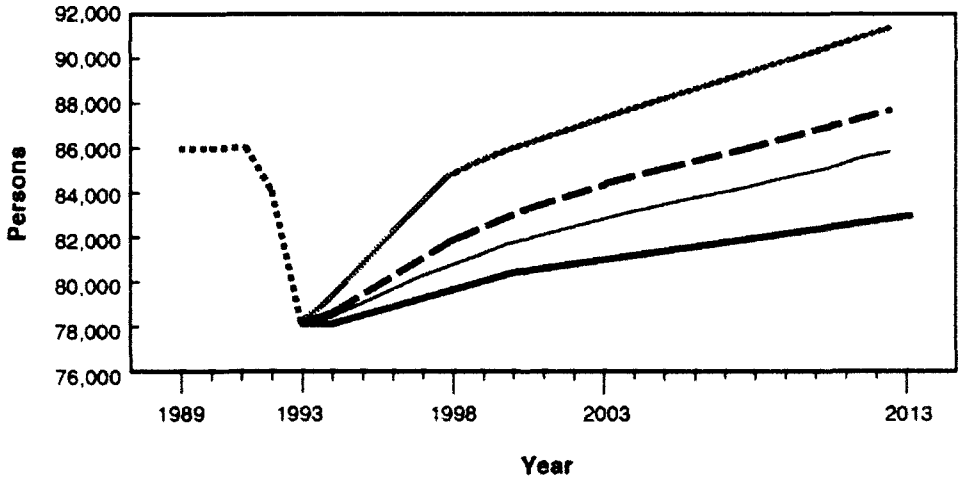
Figure S-1

ALTERNATIVE	1993[a]	1998	2003	2013
Proposed Action	0	5,002	6,203	8,352
Fire Training	0	2,148	3,275	4,749
Recreation	0	977	1,736	2,835
No-Action	0	0	0	0

Reuse-Related Population Effects



Reuse-Related Population Effects[b]



Total Population Including Reuse Effects

EXPLANATION

- Preclosure
- Proposed Action
- Fire Training Alternative
- Recreation Alternative
- No-Action Alternative

Reuse-Related Population Effects

(a) The 1993 values represent total base-related employment under the closure baseline.
(b) Employment effects represent the change in employment relative to the No-Action Alternative.

Figure S-2

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Local Community				
• Land Use and Aesthetics	**Impacts:** • Potential minor land use conflicts between adjacent industrial and commercial uses. **Mitigations:** • Appropriate design and planning.	**Impacts:** • Potential minor land use conflicts between adjacent industrial and commercial uses. • Potential aesthetic conflict between fire training activities and local recreation and tourist activities. **Mitigations:** • Appropriate design and planning • Sensitive scheduling of fire training activities and use of visual buffers could minimize aesthetic effects.	**Impacts:** • Potential minor land use conflicts between adjacent industrial and commercial uses. **Mitigations:** • Appropriate design and planning.	**Impacts:** • Potential conflict with regional development goals.
• Transportation	**Impacts:** • Segments of U.S. 23 could drop to LOS F by 1998. • No airspace conflicts. **Mitigations:** • Road improvements could raise LOS to meet transportation planning criteria.	**Impacts:** • Segments of U.S. 23 could drop to LOS F by 1998. **Mitigations:** • Road improvements could raise LOS to meet transportation planning criteria.	**Impacts:** • Segments of U.S. 23 could drop to LOS F by 2003. **Mitigations:** • Road improvements could raise LOS to meet transportation planning criteria.	**Impacts:** • Segments of U.S. 23 would drop to LOS F by 2013.

LOS = Level of service.
U.S. = U.S. highway.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 2 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Local Community (Continued)				
• Utilities Demand	**Impacts:** • Requires connection of on-base water and wastewater systems to local systems. ROI capacity is sufficient.	**Impacts:** • Requires connection of on-base water and wastewater systems to local systems. ROI capacity is sufficient.	**Impacts:** • Requires connection of on-base water and wastewater systems to local systems. ROI capacity is sufficient.	**Impacts:** • No impact on local utility systems.
Hazardous Materials and Hazardous Waste Management				
• Hazardous Materials Management	**Impacts:** • Moderate increase in types and quantities of materials. No impact with proper management.	**Impacts:** • Moderate increase in types and quantities of materials. No impact with proper management.	**Impacts:** • Small increase in types and quantities of materials. No impact with proper management.	**Impacts:** • Small quantities used by OL. No impact.
• Hazardous Waste Management	**Impacts:** • Moderate increase in types and quantities of wastes. No impact with proper management.	**Impacts:** • Moderate increase in types and quantities of wastes. No impact with proper management.	**Impacts:** • Small increase in types and quantities of wastes. No impact with proper management.	**Impacts:** • Small amounts generated by OL. No impact.
• Installation Restoration Program Sites	**Impacts:** • Possible delay in disposition of some parcels of land. • Possible land use restrictions.	**Impacts:** • Possible delay in disposition of some parcels of land. • Possible land use restrictions.	**Impacts:** • Possible delay in disposition of some parcels of land. • Possible land use restrictions.	**Impacts:** • No impact.
• Storage Tanks	**Impacts:** • No impact. All USTs not meeting regulations to be removed. Aboveground tanks to be closed in place.	**Impacts:** • No impact. All USTs not meeting regulations to be removed. Aboveground tanks to be closed in place.	**Impacts:** • No impact. All USTs not meeting regulations to be removed. Aboveground tanks to be closed in place.	**Impacts:** • No impact. Tanks removed or properly closed.

OL = Operating Location.
ROI = Region of influence.
UST = Underground storage tank.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 3 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)				
• Asbestos	**Impacts:** • Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos will require management in place.	**Impacts:** • Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos will require management in place.	**Impacts:** • Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos will require management in place.	**Impacts:** • Continued management of facilities with asbestos.
• Pesticide Usage	**Impacts:** • Moderate increase in use associated with landscaping in aviation support, industrial, and commercial land uses. No impact if managed in accordance with applicable regulation.	**Impacts:** • Moderate increase in use associated with industrial, commercial, institutional and residential land uses. No impact if managed in accordance with applicable regulation.	**Impacts:** • Small increase in use associated with commercial, industrial and institutional land uses. No impact if managed in accordance with applicable regulation.	**Impacts:** • Minimal use by OL as part of caretaker activities. No impact.
• Polychlorinated Biphenyls (PCBs)	**Impacts:** • No impact. All regulated PCBs removed prior to closure.	**Impacts:** • No impact. All regulated PCBs removed prior to closure.	**Impacts:** • No impact. All regulated PCBs removed prior to closure.	**Impacts:** • No impact. All regulated PCBs removed prior to closure.
• Radon	**Impacts:** • No impact. Current levels below 4 pCi/l.	**Impacts:** • No impact. Current levels below 4 pCi/l.	**Impacts:** • No impact. Current levels below 4 pCi/l.	**Impacts:** • No impact. Current levels below 4 pCi/l.

PCB = Polychlorinated biphenyls.
pCi/l = Picocuries per liter.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 4 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)				
• Medical/Biohazardous Waste	**Impacts:** • Small quantities generated by clinic. Within capacity of approved incinerator.	**Impacts:** • Small quantities generated by clinic. Within capacity of approved incinerator.	**Impacts:** • Small quantities generated by clinic. Within capacity of approved incinerator.	**Impacts:** • No impact. None generated.
• Ordnance	**Impacts:** • No impact. Ranges cleared prior to closure. Proper maintenance of public use range required.	**Impacts:** • No impact. Ranges cleared prior to closure.	**Impacts:** • No impact. Ranges cleared prior to closure.	**Impacts:** • No impact. Ranges cleared prior to closure.
Natural Environment				
• Soils and Geology	**Impacts:** • Minor erosion effects from 551 acres of ground disturbance. **Mitigations:** • Use of cover and limiting exposure time would minimize erosion effects.	**Impacts:** • Minor erosion effects from 351 acres of ground disturbance. • Possible soil contamination by runoff from burn areas. **Mitigations:** • Use of cover and limiting exposure time would minimize erosion effects. • Use of bermed pads, lined retention pond, sewers to channel runoff, and frequent leak testing and groundwater monitoring would reduce potential for soil contamination.	**Impacts:** • Minor erosion effects from 614 acres of ground disturbance. **Mitigations:** • Use of cover and limiting exposure time would minimize erosion effects.	**Impacts:** • No impact.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 5 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Natural Environment (Continued)				
• Water Resources	**Impacts:** • Surface water runoff from 551 acres of ground disturbance. • Beneficial effect on groundwater from closing wastewater seepage beds. **Mitigations:** • Control of runoff, minimizing exposure time and area, use of landscaping, and regular street sweeping could reduce effects of runoff on water quality.	**Impacts:** • Surface water runoff from 351 acres of ground disturbance. • Beneficial effect on groundwater from closing wastewater seepage beds. • Possible water contamination by runoff from burn areas. **Mitigations:** • Control of runoff, minimizing exposure time and area, use of landscaping, and regular street sweeping could reduce effects of runoff on water quality. • Use of bermed pads, lined retention pond, sewers to channel runoff, and frequent leak testing and groundwater monitoring could reduce potential for groundwater contamination.	**Impacts:** • Surface water runoff from 614 acres of ground disturbance. • Beneficial effect on groundwater from closing wastewater seepage beds. **Mitigations:** • Control of runoff, minimizing exposure time and area, use of landscaping, and regular street sweeping could reduce effects of runoff on water quality.	**Impacts:** • No impact.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 6 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Natural Environmental (Continued)				
• Air Quality	**Impacts:** • Regional emissions will not exceed NAAQS or PSD Class II standards.	**Impacts:** • Forest fires 1-2 times annually may exceed NAAQS and PSD Class II standards for 24-hour PM_{10} emissions. **Mitigation:** • Conduct forest fires under *meteorological conditions* that provide good dispersion.	**Impacts:** • Regional emissions will not exceed NAAQS or PSD Class II standards.	**Impacts:** • No impact.
• Noise	**Impacts:** • No residents exposed to DNL 65 dB or greater from aircraft operations. • Increase of 156 people exposed to DNL 65 dB or greater due to surface traffic noise. **Mitigations:** • Regional traffic planning to reduce surface traffic noise effects.	**Impacts:** • Increase of 139 people exposed to DNL 65 dB or greater due to surface traffic noise. **Mitigations:** • Regional traffic planning to reduce surface traffic noise effects.	**Impacts:** • Increase of 68 people exposed to DNL 65 dB or greater due to surface traffic noise. **Mitigations:** • Regional traffic planning to reduce surface traffic noise effects.	**Impacts:** • No increase in number of people exposed to DNL 65 dB or greater due to surface traffic noise.

dB = Decibel.
DNL = Day-night average sound level.
NAAQS = National Ambient Air Quality Standards.
PSD = Prevention of Significant Determination.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 7 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Natural Environment (Continued)				
• Biological Resources	**Impacts:** • No planned activities that would disturb wetland areas.	**Impacts:** • No planned activities that would disturb wetland areas. • Potential adverse effects on habitat and wildlife from fires and runoff. • Potential harmful effects to wildlife drinking from water retention pond. • Potential improvement in forest habitat from controlled burning. **Mitigations:** • Wetland areas separated from burn areas by vegetative buffer. • Appropriate forest management techniques in forest fire planning. • Inspect for wood turtles and, if present, move before controlled burns. • Cover water retention pond to prevent wildlife from drinking.	**Impacts:** • No planned activities that would disturb wetland areas.	**Impacts:** • Potential benefit due to reduced human activity.

Table S-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 8 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Natural Environment (Continued)				
• Cultural Resources	**Impacts:** • No effects on historic, traditional, or paleontological resources. • Potential impact to one archaeological site, potentially eligible for listing on the NRHP, located on land leased from the U.S. Forest Service. **Mitigations:** • Consultation among federal agency, SHPO, and Advisory Council in development and implementation of mitigation strategies.	**Impacts:** • No effects on historic, traditional, or paleontological resources. • Potential impact to one archaeological site, potentially eligible for listing on the NRHP, located on land leased from the U.S. Forest Service. **Mitigations:** • Consultation among federal agency, SHPO, and Advisory Council in development and implementation of mitigation strategies.	**Impacts:** • No effects on historic, traditional, or paleontological resources. • Potential impact to one archaeological site, potentially eligible for listing on the NRHP, located on land leased from the U.S. Forest Service. **Mitigations:** • Consultation among federal agency, SHPO, and Advisory Council in development and implementation of mitigation strategies.	**Impacts:** • Adequate security would preclude indirect impacts to archaeological site.

NRHP = National Register of Historic Places.
SHPO = State Historic Preservation Officer.

Local Community. Redevelopment of base property under the Proposed Action would result in an increase in employment and population in the region of influence (ROI), which consists of the Michigan counties of Iosco, Alcona, Alpena, and Arenac. An increase of 4,285 direct jobs and 2,582 secondary jobs is projected by 2013, compared with the 50 direct and 11 secondary jobs projected under the No-Action Alternative. Approximately 49 percent of the direct jobs and 10 percent of the secondary jobs are projected to be held by in-migrating workers. Total ROI employment would reach 42,471 by 2013, an increase of almost 20 percent over No-Action Alternative projections for that year. Population increase in the ROI as a result of the Proposed Action would be 8,352 by 2013. ROI population would reach 91,252 in 2013, an increase of 10 percent over No-Action Alternative projections for that year.

Land use on base would be similar to existing uses, except that industrial and commercial development in the main base area, WSA, and alert area would increase. There would be a potential for land use conflicts between adjacent industrial and commercial uses in the main base area, but these could be avoided with proper planning.

Traffic on local roads would be greater than under the No-Action Alternative. The level of service (LOS), a traffic volume-to-capacity ratio, along some segments of U.S. 23 through Oscoda and Au Sable would deteriorate to preclosure conditions (i.e., LOS F) by 1993. Implementation of road improvements could raise LOS to meet transportation planning criteria. No airspace or air transportation conflicts would be associated with the Proposed Action.

Utility consumption associated with the Proposed Action would represent a relatively small increase in the total ROI demand based on existing capacity and past consumption levels. On-base utility systems would be interconnected to local systems to provide water and wastewater services for reuse. The Oscoda sewage treatment plant would eventually have to be upgraded. There is sufficient capacity in local utility systems to meet the projected demands.

Hazardous Materials and Hazardous Waste Management. The types of hazardous materials used and hazardous wastes generated by the Proposed Action are expected to be similar to those present during preclosure use. The quantities are expected to be greater than under the No-Action Alternative. The responsibility for managing hazardous materials and wastes would shift from a single user to multiple, independent users, which may degrade the capability of responding to hazardous materials and hazardous waste spills. The use of pesticides in the aviation support, industrial, and commercial areas would increase from closure conditions. It is assumed that

adequate management procedures would be implemented, as required by applicable laws and regulations, to ensure proper use and handling of hazardous materials and wastes and pesticides.

Reuse activities are not expected to affect the remediation of Installation Restoration Program (IRP) sites, which is proceeding according to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Remediation of the Air Force's IRP sites is, and will continue to be, the responsibility of the Air Force. Disposal and reuse of some Wurtsmith AFB properties may be delayed or limited by the extent and type of contamination at IRP sites and by current and future IRP remediation activities. Based on the results of IRP investigations, the Air Force may, where appropriate, place limits on land reuse of Air Force fee-owned property through deed restrictions on conveyances and use restrictions on leases. It is assumed that the Air Force will continue to have control of non-fee-owned property in order to complete remediation activities at IRP sites.

Existing underground storage tanks (USTs) not in conformance with current regulations would be removed by the Air Force; the fuel hydrant system would be rendered inoperable (sections would be removed, filled with inert material, or otherwise treated), in accordance with applicable regulations. All polychlorinated biphenyls (PCB) and PCB-contaminated equipment under Air Force control have been removed from the base. Demolition or renovation of certain structures with asbestos-containing materials would be the responsibility of new owners and would be conducted in compliance with applicable Occupational Safety and Health Administration (OSHA) regulations and National Emissions Standards for Hazardous Air Pollutants (NESHAP). A survey conducted on base revealed radon levels below the Environmental Protection Agency (EPA) recommended threshold for mitigation. The EOD and grenade ranges were cleared of unexploded ordnance prior to base closure; the berm at the small arms range will be sifted for lead bullets prior to disposal of that parcel. If the small arms range is reused as a public firing range, proper maintenance procedures would have to be followed to reduce the potential for lead contamination in the soils.

Natural Environment. The Proposed Action would result in minor effects on soils, geology, and water resources from ground disturbance associated with facility construction, renovations, and demolition or infrastructure improvements. There is an abundant water supply from surface and groundwater sources in the ROI. Air pollutant emissions associated with the Proposed Action would be greater than under the No-Action Alternative, but would still remain below preclosure levels and below federal and state standards.

Aircraft noise associated with the Proposed Action would be far less than that prior to base closure. Day-night noise levels (DNL) of 65 decibels (dB)

or greater from aircraft operations would be contained within the airfield area. The number of people living in areas exposed to surface traffic noise levels of DNL 65 dB or greater would be 12 percent (156 people) greater than under the No-Action Alternative. Use of noise barriers and proper land use planning could reduce the effects of surface traffic noise.

Disturbance to vegetation and wildlife from recreational use of forested areas would be limited and similar to that in the adjacent state and national forests. Although there could be localized, short-term effects on wildlife due to limited ground-disturbing activities, the Proposed Action would result in no adverse impacts to federally or state-listed threatened or endangered species. No disturbance is proposed near the on-base wetlands, so there would be no adverse effects on those sensitive habitats. In fact, reduction in activities in the northwestern part of the base (termination of use of the EOD area and grenade launching range) could result in beneficial effects to wetlands there.

Archaeological site 201s98, a lithic scatter, has not yet been evaluated for eligibility to the *National Register of Historic Places*. The site is located on land leased from the U.S. Forest Service, and would, thus, remain under federal jurisdiction after base closure. Any impacts would be managed in accordance with requirements of Section 106 of the National Historic Preservation Act. Mitigation measures that could be employed to reduce potential impacts to a non-adverse level include avoidance, stabilization, preservation in place, or data recovery. There would be no effects on historic, traditional, or paleontological resources.

FIRE TRAINING ALTERNATIVE

Local Community. This alternative would generate an increase of 2,498 direct jobs and an additional 1,191 secondary jobs by 2013, compared with the 50 direct and 11 secondary jobs projected under the No-Action Alternative. As with the Proposed Action, approximately 49 percent of direct jobs and 10 percent of secondary jobs are projected to be held by in-migrating workers. Total ROI employment would reach 39,293 by 2013, an increase of 10 percent over No-Action Alternative projections for that year. Population in the ROI under the Fire Training Alternative would increase by 4,749 by 2013. This alternative would result in a total ROI population of 87,649 by 2013, an increase of almost 6 percent over No-Action Alternative projections for that year.

The major on-base land use changes would be associated with the fire training use planned for the northwestern part of the base. The fire training activities could represent a potential aesthetic conflict with recreational and tourist activities in the local area. This conflict could be avoided or minimized by use of careful scheduling of fire training activities and use of visual buffers around fire training areas. In addition, there would be a

potential for land use conflicts between adjacent industrial and commercial uses in the main base area, but these could be avoided with proper planning.

Traffic volumes on local roads would be greater than under the No-Action Alternative, and the LOS along some segments of U.S. 23 in Oscoda and Au Sable would deteriorate to preclosure conditions (LOS F) by 1998. Implementation of road improvements could raise LOS to meet transportation planning criteria. Utility demands would be lower than those under the Proposed Action and within the capacities of local utility systems. The on-base water and wastewater systems would be interconnected to local systems to support reuse.

Hazardous Materials and Hazardous Waste Management. Some of the hazardous materials used in the Fire Training Alternative would be different from those used during preclosure conditions and the Proposed Action. These materials would include propane, fuel oil/gasoline mixtures, alcohols, flares, laboratory chemicals, and combustible metals such as magnesium and aluminum. All operations will comply with National Fire Protection Association standards for safety. The Great Lakes Fire Training Academy would be responsible for management of hazardous materials and wastes, and for compliance with all applicable federal, state, and local regulations. The fire fighting water collection system and retention pond would be managed in accordance with applicable state permitting and environmental monitoring requirements. Other aspects of hazardous materials and hazardous waste management associated with this alternative would be similar to those discussed under the Proposed Action.

Natural Environment. Effects on soils and geology would be smaller for this alternative than for the Proposed Action, because of the smaller amount of ground disturbance that would be associated with construction and demolition activities. Water runoff from fire training activities could cause adverse effects to soils and water quality. Measures to prevent or minimize effects to soils and groundwater include use of a double-lined retention pond for used fire fighting water, conducting pollution-generating exercises on bermed pads, channeling runoff in a collection system, and use of oil/water separators. Appropriate leak testing of the sewers and regular monitoring of groundwater quality (using existing equipment and wells) should be performed to ensure that effects are minor.

Air emissions from routine fire training activities would be greater than under the No-Action Alternative, but pollutant concentrations should not rise above federal and state standards. Particulate emissions from forest fire training activities could exceed National Ambient Air Quality Standards (NAAQS) and allowable increments under Prevention of Significant Deterioration regulations for 24-hour average concentrations. These activities would be conducted only once or twice annually under meteorological conditions that favor dispersion, and effects would be short-term and localized. The number

of residents exposed to surface traffic noise levels of DNL 65 dB or greater would be 11 percent (139 people) greater than under the No-Action Alternative. Mitigation measures similar to those discussed for the Proposed Action could be implemented to minimize surface traffic noise effects.

There would be a potential for disturbance to wildlife and effects to wetlands as a result of forest fire training activities, but these effects would be minimal. The fire fighting water retention pond should be enclosed and covered to prevent wildlife from drinking the water, which could contain residual amounts of harmful substances. There would be no adverse effects on threatened and endangered species; in fact, controlled burning could increase the amount of habitat on base suitable for the endangered Kirtland's warbler. Controlled burning of some of the forested areas in the northwestern part of the base could also have general beneficial effects on the forest habitat by removing debris and increasing biological diversity. Effects on cultural resources would be identical to those under the Proposed Action.

RECREATION ALTERNATIVE

Local Community. This alternative would generate an increase of 1,473 direct and 712 secondary jobs by 2013, compared with the 50 direct and 11 indirect jobs projected under the No-Action Alternative. As with the Proposed Action and Fire Training Alternative, approximately 49 percent of direct jobs and 10 percent of indirect jobs are projected to be held by in-migrating workers. Total ROI employment would be 37,789 in the same year, an increase of 6 percent over No-Action Alternative projections for that year. Population in the ROI under this alternative would increase by 2,835 by 2013, resulting in a total ROI population of 85,735. The total population figure represents an increase of more than 3 percent over No-Action Alternative projections for 2013.

The major land use changes on base would be a decrease in the amount of development and an increase in open space, as a result of closing or demolishing more than one-half of the on-base facilities. There would be a potential for land use conflicts between adjacent industrial and commercial uses in the main base area, but these could be avoided with proper planning.

Traffic on local roads would be greater than under the No-Action Alternative, and the LOS along some segments of U.S. 23 in Oscoda and Au Sable would deteriorate to preclosure conditions (LOS F) by 2003. Implementation of roadway improvements could raise the LOS to meet transportation planning criteria. Utility demands would be less than those described under the Proposed Action and Fire Training Alternative. The on-base water and wastewater systems would be interconnected to local systems to support reuse.

Hazardous Materials and Hazardous Waste Management. Use of hazardous materials and generation of hazardous wastes would be greater than under the No-Action Alternative, but much less than under the Proposed Action or Fire Training Alternative. Other aspects of hazardous materials and hazardous waste management would be similar to those discussed under the Proposed Action.

Natural Environment. Potential impacts from this alternative on soils, geology, and water resources would be greater than for the Proposed Action and Fire Training Alternative because there would be more ground disturbance, primarily associated with demolition activities. With use of standard mitigation measures, however, impacts could be minimized. Effects on air quality in the region would be greater than under the No-Action Alternative, but less than under the other alternatives. The number of residents exposed to surface traffic noise levels of DNL 65 dB or greater would be 5 percent (68 people) greater than under the No-Action Alternative. Mitigations similar to those discussed for the Proposed Action could be implemented to reduce surface traffic noise effects.

The Recreation Alternative could result in overall positive effects on biological resources due to the reduced amount of human activity and the proposal to conserve large areas for public and recreational uses. Other effects on biological resources would be similar to those under the Proposed Action. Effects on cultural resources would be identical to those under the Proposed Action.

NO-ACTION ALTERNATIVE

Local Community. The only Air Force activities associated with the No-Action Alternative would be caretaker maintenance of the Air Force fee-owned property by the Air Force Base Disposal Agency Operating Location (OL). The other property owners would be responsible for maintenance of their own properties. Caretaker activities would generate approximately 50 direct and 11 secondary jobs throughout the 20-year analysis period. There would be no land use impacts from the No-Action Alternative, but keeping the base closed would represent a conflict with state and local plans for reuse. The LOS on U.S. 23 at the junction with County Road F-41 would drop to F by 2013 due to regional population growth; all other key local roads would operate at LOS B or better. No effects on air transportation are expected. Utility consumption in the ROI would decrease from 1993 (closure) to 2013 without base reuse, as a result of a projected decline in population in the immediate Oscoda area over that time.

Hazardous Materials and Hazardous Waste Management. Small quantities of various types of hazardous materials and pesticides would be used for caretaker activities. All materials and waste would be managed and controlled by the OL in accordance with applicable regulations. IRP activities

would continue. Storage tanks would be removed or properly closed according to applicable standards.

Natural Environment. The No-Action Alternative would not cause adverse effects to soils, geological resources, water resources, air quality, noise, or cultural resources. This alternative could have overall beneficial effects on biological resources as a result of the reduction in human activity, noise, and ground disturbance compared to preclosure conditions.

OTHER LAND USE CONCEPTS

Other potential land uses are analyzed in terms of their effects on employment, population, and the environment when combined with any of the alternatives. The GLMAC proposal for an Advanced Environmental Technology Facility is the one independent land use concept analyzed herein. Impacts on the local community and the environment if this proposal was implemented are summarized in Table S-3.

Advanced Environmental Technology Facility. It is projected that a maximum of 20 permanent staff and up to 40 temporary research students annually would work at this research and development facility. The only potential additional effects associated with establishment of this facility in conjunction with any of the alternatives would be from small amounts of hazardous materials used and hazardous wastes generated during sampling and analysis activities. All hazardous materials and wastes would be managed in accordance with applicable federal, state, and local regulations by qualified personnel. Implementation of this proposal could result in the acceleration of remediation activities at selected IRP sites, which could accelerate disposal of those parcels.

SUMMARY OF PUBLIC COMMENTS

The Draft EIS (DEIS) for disposal and reuse of Wurtsmith AFB was made available for public review and comment in March 1993. A public hearing was held in Oscoda on April 5, at which the Air Force presented the findings of the DEIS. Public comments received both verbally at the public meeting and in writing during the response period have been reviewed and are addressed by the Air Force in Chapter 9 of this EIS. In addition, the text of the EIS itself has been revised, as appropriate, to reflect the concerns expressed in the public comments. The responses to the comments in Chapter 9 indicate the relevant sections of the EIS that have been revised.

The major comments received on the DEIS were:

- Concerns regarding protection of public water supplies from contamination resulting from base reuse.

- Concerns regarding discussion of federal and Air Force requirements for taking an action in a floodplain.

- A recommendation from the Michigan State Historic Preservation Officer that additional archaeological investigations be conducted.

SUMMARY OF CHANGES FROM THE DEIS TO THE FEIS

Based on more recent studies or comments from the public, the following sections of the EIS have been updated or revised:

- Figures and text referring to Air Force fee-owned property have been updated in accordance with a 1936 statute that deletes the reverter provision in the statute authorizing the 1935 conveyance

- Text discussing public water supplies and means to avoid contamination associated with base reuse activities has been added to the Water Resources section

- Text has been added to Section 4.4.2, Water Resources, to address federal and Air Force regulations regarding actions taken in a floodplain

- Text has been added to Section 4.4.6, Cultural Resources, discussing effects of base disposal and reuse on potentially eligible cultural resources.

Table S-3. Summary of Impacts from Other Land Use Concepts

Resource Category	Advanced Environmental Technology Facility
Local Community	
• Land Use and Aesthetics	No change in land use
• Transportation	No change in surface or air traffic
• Utilities	No change in utility demand
Hazardous Materials and Hazardous Waste Management	
• Hazardous Materials Management	Use of small quantities associated with a research laboratory
• Hazardous Waste Management	Small quantities generated
• Installation Restoration Program Sites	Potential acceleration of remediation activities and disposal of land parcels
• Storage Tanks	No new storage tanks
• Asbestos	Renovation of existing buildings may require removal and disposal and/or management in place
• Pesticide Usage	Small quantities to be utilized for landscaping
• Polychlorinated Biphenyls	No impact
• Radon	Below level of concern
• Medical/Biohazardous Wastes	None generated
• Ordnance	Not applicable
Natural Environment	
• Soils and Geology	No new disturbance
• Water Resources	No additional demand
• Air Quality	No new emissions
• Noise	No new sources; no increase in receptors
• Biological Resources	No impact
• Cultural Resources	No impact

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CHAPTER 1
PURPOSE OF AND NEED FOR ACTION

1.0 PURPOSE OF AND NEED FOR ACTION

This environmental impact statement (EIS) examines the potential for impacts to the environment as a result of the disposal and reuse of Wurtsmith Air Force Base (AFB), Michigan. This document has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality (CEQ) regulations implementing NEPA. Appendix A presents a glossary of terms, acronyms, and abbreviations used in this document.

1.1 PURPOSE OF AND NEED FOR

Due to the changing international political scene and the resultant shift toward a reduction in defense spending, the Department of Defense (DOD) must realign and reduce its military forces pursuant to the Defense Base Closure and Realignment Act (DBCRA) of 1990 (Public Law [P.L.] 101-510, Title XXIX). DBCRA established new procedures for closing or realigning military installations in the United States.

DBCRA established an independent Defense Base Closure and Realignment Commission (hereafter "Commission") to review the Secretary of Defense's base closure and realignment recommendations. After reviewing these recommendations, the 1991 Commission forwarded its recommended list of base closures and realignments to the President, who accepted the recommendations and submitted them to Congress on July 12, 1991. Since Congress did not disapprove the recommendations within the time period provided under DBCRA, the recommendations became law.

Because Wurtsmith AFB is on the 1991 Commission's list, the decision to close the base is final. Wurtsmith AFB was closed on June 30, 1993.

To fulfill the requirement of reducing defense expenditures, the Air Force plans to dispose of excess and surplus real property and facilities at Wurtsmith AFB. DBCRA requirements relating to disposal of excess and surplus property include:

- Environmental restoration of the property as soon as possible with funds made available for such restoration
- Consideration of the local community's reuse plan prior to Air Force disposal of the property
- Compliance with specific federal property disposal laws and regulations.

The Air Force action, therefore, is to dispose of Wurtsmith AFB property and facilities. Usually, this action is taken by the Administrator of General Services. However, DBCRA required the Administrator to delegate to the Secretary of Defense the authorities to utilize excess property, dispose of surplus property, convey airport and airport-related property, and determine the availability of excess or surplus real property for wildlife conservation purposes. The Secretary of Defense has since redelegated these authorities to the respective Service Secretaries.

1.2 DECISIONS TO BE MADE

The purpose of this EIS is to provide information for interrelated decisions concerning the disposition of Wurtsmith AFB. The EIS is to provide the decision-maker and the public the information required to understand the future potential environmental consequences of disposal as a result of reuse options at Wurtsmith AFB.

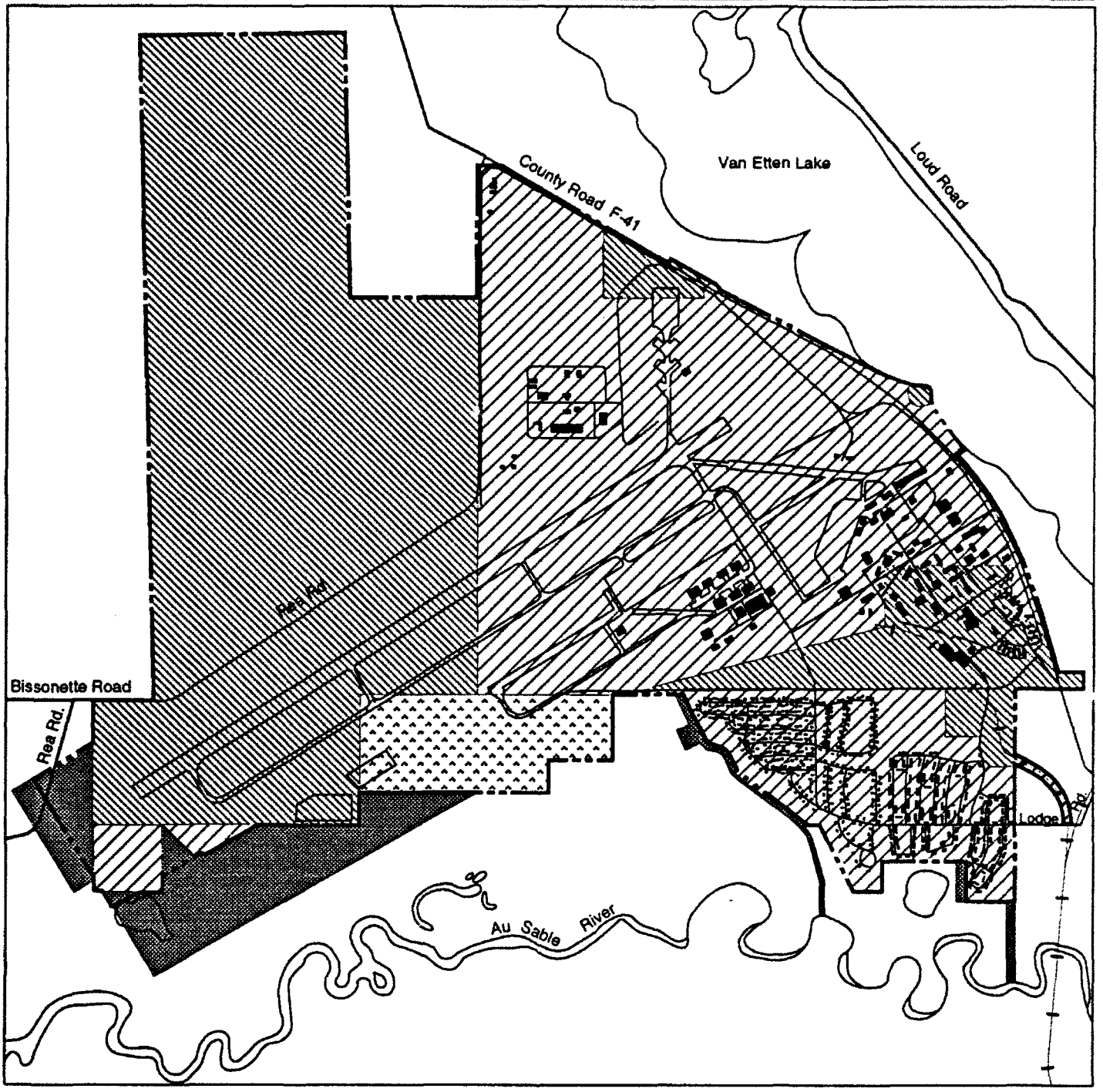
After completion of this EIS, the Air Force will issue a Record of Decision (ROD) on the Disposal of Wurtsmith AFB. The ROD will determine the following:

- What property is excess to the needs of the DOD and what property is surplus to the needs of the United States of America
- The methods of disposal to be followed by the Air Force
- The terms and conditions of disposal.

The methods of disposal granted by the Federal Property and Administrative Services Act of 1949 and the Surplus Property Act of 1944 and implemented in the Federal Property Management Regulations (FPMR) are:

- Transfer to another federal agency
- Public benefit conveyance to an eligible entity
- Negotiated sale to a public body for a public purpose
- Competitive sale by sealed bid or auction.

The EIS considers the environmental impacts of the Air Force's disposal of that portion of the base property owned unconditionally by the Air Force. The real estate portion owned unconditionally by the Air Force comprises approximately 42 percent (1,943 acres) of the base land (Figure 1.2-1). The remaining 58 percent (2,683 acres) of base land (non-fee-owned property) currently controlled by the Air Force has been acquired for limited durations from numerous individuals and agencies, including the State of Michigan and



EXPLANATION

- Air Force Fee-Owned
- Lease
- Permit from U.S. Forest Service
- Easement
- Base Boundary

0 750 1500 3000 Feet

Air Force Real Estate Interests on Wurtsmith AFB

Figure 1.2-1

the U.S. Forest Service. The Air Force must surrender its limited rights to this property when the land is no longer needed for military purposes and after all legal obligations relating to the Air Force's use of the property have been satisfied. Because the Air Force decision on whether and how to dispose of the Air Force fee-owned property may influence how the other 58 percent of the base property will be reused, the EIS analyzes the environmental effects of the overall reuse of all of the base property. The Proposed Action and alternatives evaluated in this EIS consider all of the area within the base boundary.

The EIS portrays, as alternatives, a variety of potential land uses to cover reasonably foreseeable reuses of the property and facilities by others. Several alternative scenarios were used to group reasonable land uses and to examine the environmental effects of redevelopment of Wurtsmith AFB. This methodology was employed because, although the disposal will have few, if any, direct effects, future use and control of use by others will create indirect effects. This EIS, therefore, seeks to analyze reasonable redevelopment scenarios to determine the potential indirect environmental effects of Air Force decisions.

1.3 DISPOSAL PROCESS AND REUSE PLANNING

DBCRA requires compliance with NEPA (with some exceptions) in the implementation of the base closures and realignments. Among the issues that were excluded from NEPA compliance are the selection of installations for closure or realignment and analysis of closure impacts.

The Air Force goal is to dispose of its 1,943 acres of Wurtsmith AFB property through transfer and/or conveyance to other state or local government agencies or private parties. The Proposed Action in the EIS reflects the community's goal for base reuse.

The Air Force has based its Proposed Action on plans developed by the Wurtsmith Area Economic Adjustment Commission (WAEAC) for the purpose of conducting the environmental analysis. The Air Force also considered additional reasonable alternatives in order to provide the decision-maker with multiple options regarding ultimate property disposition. The EIS becomes the basis for a broad environmental analysis, thus ensuring that reasonably foreseeable impacts resulting from potential reuse have been identified. Subject to the terms of transfer or conveyance, the recipients of the property, planning and zoning agencies, and elected officials will ultimately determine the reuse of the property. Three alternatives to the Proposed Action have been identified: two non-aviation reuse plans and a No-Action Alternative, which would not involve reuse.

The Secretary of the Air Force has discretion in determining how the Air Force will dispose of its 1,943 acres of Air Force fee-owned property.

DBCRA requires the Air Force to comply with federal property disposal laws and federal property management regulations. Nevertheless, the Air Force must adhere to the law, including General Services Administration (GSA) regulations (41 CFR 101-47), in accordance with DBCRA. The services were authorized to issue additional regulations, if required, to implement their delegated authorities and the Air Force has issued supplemental regulations 41 CFR 132. DBCRA requires the services to consult with the state Governor, heads of local governments, or equivalent political organizations for the purpose of considering any plan for the use of such property by the local community concerned. Accordingly, the Air Force is working with state authorities and the WAEAC to meet this requirement.

In some cases, compliance with environmental laws may delay reuse of some parts of the base. Until property can be disposed of or surrendered, the Air Force may execute interim or long-term leases to allow reuse to begin as quickly as possible. The Air Force would structure the leases to provide the lessees with maximum control over the property, consistent with the terms of the final disposal. Restrictions may be necessary to ensure the protection of human health and the environment and to allow implementation of required remedial actions. Environmental analysis in the EIS encompasses those possible interim or long-term leasing decisions.

Certain activities inherent in the development or expansion of an airport constitute federal actions that fall under the statutory and regulatory authority of the Federal Aviation Administration (FAA). The FAA generally reviews these activities through the processing and approval of an Airport Layout Plan (ALP). Goals of the ALP review system are to: (1) determine its effectiveness in achieving safe and efficient utilization of airspace, (2) assess factors affecting the movement of air traffic, and (3) establish conformance with FAA design criteria. The FAA approval action may also include other specific elements such as preparation of the Airport Certification Manual (Part 139); the Airport Security Plan (Part 107); the location, construction, or modification of an air traffic control (ATC) tower, terminal radar approach control (TRACON) facility and other navigational and visual aids and facilities; and establishment of instrument approach procedures.

In view of its possible direct involvement with the disposal of Wurtsmith AFB, the FAA is serving as a cooperating agency in the preparation of the EIS. If surplus property is conveyed to a local agency for airport purposes, the FAA will be the federal agency that would enforce deed covenants requiring the property to be used for airport purposes. Additionally, the FAA may later provide airport improvement program grants to the airport sponsor (local agency taking title). The FAA also has special expertise and the legal responsibility to make recommendations to the Air Force for the disposal of surplus property for airport purposes. The Surplus Property Act of 1944 (50 U.S. Code [U.S.C.] Appendix 1622[g]), authorized disposal of surplus

real and related personal property for airport purposes and requires the FAA to certify that the property is necessary, suitable, and desirable for an airport.

The potential environmental impacts of airport development must be assessed prior to commitment of federal funding, in accordance with NEPA and FAA Orders 1050.1D, *Policies and Procedures for Considering Environmental Impacts*, and 5050.4A, *Airport Environmental Handbook*. Environmental impacts must be assessed prior to authorization of plans of local agencies for the development of the entire area in which the airport is located. Section 4(f) of the Department of Transportation (DOT) Act (recodified at 49 U.S.C., Subtitle I, Section 303) provides that the Secretary of Transportation shall not approve any program or project which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land of an historic site of national, state, or local significance as determined by the officials having jurisdiction thereof unless there is no feasible and prudent alternative to the use of such land and such program or project includes all possible planning to minimize harm resulting from the use.

Compliance with FAA regulations requires the preparation of a proposed airport development plan. This EIS presents the assessment of potential environmental impacts of available plans. If a reuse proponent has developed only conceptual plans for the airport area, the potential environmental impacts of that concept plan are analyzed. The FAA may then use this document to complete their NEPA requirements. This EIS also provides environmental analyses to aid FAA decisions on funding requests for airport development projects. The new owners would be required to prepare a final ALP and submit it to the FAA, as appropriate, for approval.

1.4 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

NEPA established a national policy to protect the environment and ensure that federal agencies consider the environmental effects of actions in their decision-making. The CEQ is authorized to oversee and recommend national policies to improve the quality of the environment, and has published regulations that described how NEPA should be implemented. The CEQ regulations encourage federal agencies to develop and implement procedures that address the NEPA process in order to avoid or minimize adverse effects on the environment. Air Force Regulation (AFR) 19-2, Environmental Impact Analysis Process (EIAP), addresses implementation of NEPA as part of the Air Force planning and decision-making process.

NEPA, CEQ regulations, FAA Orders 1050.1D and 5050.4A, and AFR 19-2 provide guidance on the types of actions for which an EIS must be prepared. Once it has been determined that an EIS must be prepared, the proponent must publish a Notice of Intent (NOI) to prepare an EIS. This formal

announcement signifies the beginning of the scoping period, during which the major environmental issues to be addressed in the EIS are identified. A Draft EIS (DEIS) is prepared, which includes the following:

- A statement of the purpose of and need for the action
- A Description of the Proposed Action and Alternatives, including the No-Action Alternative
- A description of the environment that would be affected by the Proposed Action and alternatives
- A description of the potential environmental consequences of the Proposed Action and alternatives.

The DEIS is filed with the U.S. Environmental Protection Agency (EPA), and is circulated to the interested public and government agencies for a period of at least 45 days for review and comments. During this period, a public hearing will be held so that the proponent can summarize the findings of the analysis and receive input from the affected public. At the end of the review period, all substantive comments received must be addressed. A Final EIS (FEIS) is produced that contains responses to comments as well as changes to the document, if necessary.

The FEIS is then filed with EPA and distributed in the same manner as the DEIS. Once the FEIS has been available for at least 30 days the Air Force may publish its ROD for the action.

1.4.1 Scoping Process

The Air Force has complied with NEPA requirements for public involvement in the decision process for this EIS through the scoping process. In this process, the significant environmental issues relevant to disposal and reuse are identified and the public is given an opportunity to be involved in the development of the EIS. The NOI (Appendix B) to prepare an EIS for disposal and reuse of Wurtsmith AFB was published in the *Federal Register* on October 9, 1991. Notification of public scoping was also made through local media as well as through letters to federal, state, and local agencies and officials and interested groups and individuals.

A public meeting was held on November 7, 1991 at Oscoda High School, in Oscoda, Michigan, to solicit comments and concerns from the general public on the disposal and reuse of Wurtsmith AFB. Approximately 50 people attended the meeting. Representatives of the Air Force presented an overview of the meeting's objectives, agenda, and procedures, and described the process and purpose for the development of a disposal and reuse EIS. In addition to verbal comments, written comments were received

during the scoping process. These comments, as well as information from the local community, experience with similar programs, and NEPA requirements, were used to determine the scope and direction of studies/analyses to accomplish this EIS.

1.4.2 Public Comment Process

The DEIS was made available for public review and comment in March 1993. Copies of the DEIS were made available for review in local libraries and provided to those requesting copies. At a public hearing held on April 5, the Air Force presented the findings of the DEIS and invited public comments. All comments were reviewed and addressed, when applicable, and have been included in their entirety in this document. Responses to comments offering new or changes to data and questions about the presentation of data are also included. Comments simply stating facts or opinions, although appreciated, did not require specific responses. Chapter 9, Public Comments and Responses, more thoroughly describes the comment and response process.

1.5 CHANGES FROM THE DEIS TO THE FEIS

The text of this EIS has been revised, where appropriate, to reflect concerns expressed in public comments. These changes range from typographical corrections to amendments of reuse plans. The responses to the comments indicate the relevant sections of the EIS that have been revised. The major comments received on the DEIS were:

- Concerns regarding protection of public water supplies from contamination resulting from base reuse
- Concerns regarding discussion of federal and Air Force requirements for taking an action in a floodplain
- A recommendation from the Michigan State Historic Preservation Officer (SHPO) that additional archaeological investigations be conducted.

Based on more recent studies and/or comments received, the following sections of the EIS have been updated or revised:

- Figures and text referring to Air Force fee-owned property have been updated, in accordance with a 1936 statute that deletes the reverter provision in the statute authorizing the 1935 conveyance.
- Text discussing public water supplies and means to avoid contamination associated with base reuse activities has been added to Water Resources, Sections 3.4.2 and 4.4.2.

- Text has been added to Section 4.4.2, Water Resources, to address federal and Air Force regulations regarding actions taken in floodplains.

- Text has been added to Section 4.4.6, Cultural Resources, discussing effects of base disposal and reuse on potentially eligible cultural resources.

1.6 ORGANIZATION OF THIS EIS

This EIS is organized into the following chapters and appendices. Chapter 2 provides a description of the Proposed Action, reasonable alternatives to the Proposed Action, and other land use concepts that have been identified for reuse of Wurtsmith AFB property. Chapter 2 also briefly discusses alternatives eliminated from further consideration and identifies other, unrelated actions anticipated to occur in the region during the same time frame as the reuse activities to be considered in the analysis of cumulative impacts. Finally, Chapter 2 provides a comparative summary of the effects of the Proposed Action and alternatives with respect to effects on the local community and the natural environment. Chapter 3 presents the affected environment under the baseline conditions of base closure, providing a basis for analyzing the impacts of the Proposed Action and alternatives. When needed for analytical comparisons, a preclosure reference is provided for certain resource areas. It describes a point in time at or near the closure announcement, and depicts an active base condition. The results of the environmental analysis are presented in Chapter 4. Chapter 5 lists individuals and organizations consulted during the preparation of the EIS, Chapter 6 provides a list of the document's preparers, Chapter 7 contains references, and Chapter 8 contains an index. Chapter 9 describes the public comment and response process, and contains the comments and responses.

In addition to the main text, the following appendices are included in this document:

- Appendix A - a glossary of terms, acronyms, and abbreviations used in this document

- Appendix B - the NOI to prepare this disposal and reuse EIS

- Appendix C - a list of individuals and organizations who were sent a copy of the FEIS

- Appendix D - an Installation Restoration Program (IRP) bibliography

- Appendix E - a description of the methods used to evaluate the impacts of base reuse on resources of the local community and the environment

- Appendix F - a list of environmental permits held by Wurtsmith AFB

- Appendix G - tables of storage tanks at the base and pesticides stored and used

- Appendix H - Air Force policy regarding management of asbestos at bases that are closing and results of an asbestos survey at Wurtsmith AFB

- Appendix I - a list of plant and animal species occurring on and near the base, and a list of threatened, endangered and candidate species occurring on and near the base

- Appendix J - a detailed description of issues and assumptions related to noise effects

- Appendix K - a detailed methods discussion and air emissions inventory for reuse of Wurtsmith AFB

- Appendix L - letters and certifications from federal agencies regarding base conditions

- Appendix M - a matrix summarizing the influencing factors and environmental impacts of each alternative by land use category.

1.7 RELATED ENVIRONMENTAL DOCUMENTS

The environmental documents listed below have been or are being prepared separately and address environmental issues at Wurtsmith AFB. These documents provided supporting information for the environmental analysis.

- *Comprehensive Plan, Wurtsmith Air Force Base, Oscoda, Michigan, 1990*

- *Draft Environmental Impact Statement, Proposed Closure of Eaker Air Force Base, Arkansas, 1990 (with Wurtsmith AFB as candidate for closure).*

1.8 FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

Federal permits, licenses, and entitlements that may be required of recipients of Wurtsmith AFB for purposes of redevelopment are presented in Table 1.8-1.

Table 1.8-1. Federal Permits, Licenses, and Entitlements Potentially Required for Reusers or Developers of Disposed Base Property
Page 1 of 2

Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Authority	Regulatory Agency
Title V permit under the CAA	Any major source (source that emits more than 100 tons/year of criteria pollutant in nonattainment area for that pollutant or is otherwise defined in Title I of CAA as a major source); affected sources as defined in Title IV of CAA; sources subject to Section 111 regarding New Source Performance Standards; sources of air toxics regulated under Section 112 of CAA; sources required to have new source or modification permits under Parts C or D of Title I of CAA; and any other source designated by EPA regulations.	Title V of CAA, as amended by the 1990 CAA Amendments	U.S. EPA; MDNR, Division of Air Quality
National Pollutant Discharge Elimination System permit	Discharge of pollutant from any point source into waters of the United States. Storm water discharges associated with industrial activities and from large and medium municipal separate storm water systems.	Section 402 of Clean Water Act, 33 U.S.C. §1342	U.S. EPA; MDNR
Section 404 (Dredge and Fill) Permit	Any project activities resulting in the discharge of dredged or fill material into bodies of water, including wetlands, within the United States.	Section 404 of Clean Water Act, 33 U.S.C. §1344	U.S. Army Corps of Engineers, in consultation with U.S. EPA
Hazardous waste treatment, storage, or disposal facility permit	Owners or operators of a new or existing hazardous waste treatment, storage, or disposal facility	Resource Conservation and Recovery Act as amended, 42 U.S.C. §6901; 40 CFR 270	U.S. EPA; MDNR

CAA = Clean Air Act.
CFR = Code of Federal Regulations.
EPA = Environmental Protection Agency.
MDNR = Michigan Department of Natural Resources.
U.S.C. = U.S. Code.

Table 1.8-1. Federal Permits, Licenses, and Entitlements Potentially Required for Reusers or Developers of Disposed Base Property
Page 2 of 2

Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Authority	Regulatory Agency
U.S. EPA identification number	Generators or transporters (off-site transport) of hazardous waste.	40 CFR §262.10 (generators); 40 CFR 263, Subpart B (transporters)	U.S. EPA
Endangered Species Act §10 permit	Taking endangered or threatened wildlife species; engaging in certain commercial trade of endangered or threatened plants or removing such plants on property subject to Federal jurisdiction.	Section 10 of Endangered Species Act, 16 U.S.C. §1539; 50 CFR 17 Subparts C,D,F, and G.	U.S. Department of the Interior, Fish and Wildlife Service
Airport Operating Certificate	Operating a land airport serving any scheduled or unscheduled passenger operation of air carrier aircraft designed for more than 30 passenger seats.	Federal Aviation Act of 1958, 49 U.S.C. App. §1432.	U.S. Department of Transportation, Federal Aviation Administration

EPA = Environmental Protection Agency.
U.S.C. = U.S. Code.

CHAPTER 2
ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 INTRODUCTION

This section describes the Proposed Action, reasonable alternatives to the Proposed Action, and the No-Action Alternative. In addition, one independent reuse option is described and environmentally analyzed. The potential environmental impacts of the Proposed Action and alternatives are summarized in table form.

Generally, the Administrator of the GSA has authority to dispose of excess and surplus real property belonging to the federal government. With regard to closure bases, however, the DBCRA requires the GSA Administrator to delegate disposal authority to the Secretary of Defense. FPMR, which govern property disposal methods associated with base closure, allow the Secretary of Defense to dispose of closure property by transfer to another federal agency, by public benefit conveyance, by negotiated sale to state or local government, and by public sale at auction or sealed bid. These methods, or a combination of them, could be used to dispose of property at Wurtsmith AFB.

Provisions of DBCRA and FPMR require that the Air Force first notify other DOD departments that Wurtsmith AFB is scheduled for disposal. Any proposals from these departments for the transfer of Wurtsmith AFB are given priority consideration.

Pursuant to the McKinney Act, 42 U.S.C. 11411, the Air Force is required to provide the Department of Housing and Urban Development (HUD) with information regarding properties being disposed at Wurtsmith AFB. HUD makes a determination about the suitability of these properties for homeless assistance programs. HUD reported the suitability and potential availability of facilities at Wurtsmith in the November 13, 1992 *Federal Register*. Homeless assistance providers must express written interest to the Department of Health and Human Services (HHS) within 60 days of publication and submit a complete application within 150 days. After determination that the application is complete, HHS is required to approve or disapprove the application within 25 days. In disposing of surplus real property, the Air Force must give priority of consideration to uses that assist the homeless although "other compelling and meritorious uses may be considered". To date there has been no request by a homeless assistance provider for facilities or real property at Wurtsmith AFB.

An Air Force Base Disposal Agency (AFBDA) Operating Location (OL) has been established at Wurtsmith AFB. The responsibilities of the OL include coordinating post-closure activities with the active force closure activities, establishing a caretaker force to maintain Air Force-controlled properties

after closure, and serving as the Air Force local liaison to community reuse groups until lease termination, title surrender, or disposal (as appropriate) of the Air Force-controlled property has been completed. For the purposes of environmental analysis, it was assumed that this team would consist of approximately 50 people at the time of closure, conceptually composed of 10 Air Force employees and 40 non-federal supporting personnel. The OL, as used in this document, may refer to either the AFBDA or non-federal personnel.

In some cases each group may have distinct responsibilities. For example, under the No-Action Alternative, the non-federal personnel would be responsible for the management and disposition of their own hazardous materials and waste. The Air Force OL would be responsible for inspection and oversight to ensure that hazardous substance practices on Air Force-controlled property are in compliance with pertinent regulations.

In order to address the range of potential environmental impacts of disposal and reuse, three conceptual reuse alternatives have been developed:

- The Proposed Action centers around reuse of the airfield for maintenance and refurbishing and general aviation operations. Most of the existing, non-aviation, developed areas on base would be redeveloped for industrial and commercial uses. Open and undeveloped areas would primarily remain undeveloped.

- The Fire Training Alternative proposes fire training activities on the airfield and the area to the northwest. Non-airfield facilities would be developed for reuses similar to those under the Proposed Action.

- The Recreation Alternative would generate less employment and population than the other alternatives, but would provide the opportunity for numerous public and recreation uses within an extensive area of natural and potentially restored open space.

In order to accomplish impact analyses for the three conceptual plans, a set of general assumptions was made. These assumptions include employment and population changes arising from implementation of each reuse plan, consistent land use designations for similar reuse options, the proportion of ground disturbance anticipated for each land use type, transportation and utility effects of each proposal as a function of proposed land use and employment due to redevelopment, and anticipated phasing of the various elements of each reuse plan (as measured at the closure baseline, and at the baseline plus 5, 10, and 20 years, respectively). Details regarding the generation of these assumptions are found in Appendix E, Methods of Analysis. Specific assumptions developed for individual reuse plans are identified in the discussion of each proposal in Sections 2.2 and 2.3. Each alternative addresses all of the land within the base boundary. There are no

continuing use areas on or off base that are excluded from reuse plans. No off-base land use is proposed as part of any of the alternatives.

During the development of alternatives addressed in the EIS, the Air Force considered the compatibility of future land uses with current site conditions that may restrict reuse activities to protect human health and the environment. These conditions include potential contamination from releases of hazardous substances and Air Force efforts to remediate the contamination under the IRP. IRP remediation at Wurtsmith AFB and other environmental studies may result in lease/deed restrictions on Air Force fee-owned property that limit reuse options at certain locations within the base. Additionally, the Air Force may retain access rights to these sites to implement IRP remediation (e.g., temporary easement for access to monitoring wells). It is assumed that the Air Force will continue to have control of non-fee-owned property in order to complete remediation activities at IRP sites.

2.2 DESCRIPTION OF THE PROPOSED ACTION

Section 2905(b)(2)(E) of DBCRA requires the Air Force, as part of the disposal process, to consult with the applicable state governor and heads of local governments, or equivalent political organizations, for the purposes of considering any plan for the use of such property by the concerned local community. Air Force policy is to encourage timely community reuse planning by offering to use the community's plan for reuse or development of land and facilities as the Proposed Action in the EIS.

The redevelopment agency authorized to develop potential reuse options for Wurtsmith AFB is the WAEAC, formerly the Wurtsmith AFB Reuse Committee. WAEAC was formed in January 1992 as a formal advisory group. Charged with planning and implementing potential base reuse, WAEAC makes recommendations to the Oscoda Township Board of Trustees, who has the authority to make decisions regarding reuse. Recommendations from the Township Board of Trustees are referred to the Wurtsmith Base Conversion Authority (WBCA), which, under authority of the Michigan Department of Commerce, acts as a holding agency for receipt, maintenance, and disposition of base property it may receive.

WAEAC comprises a Coordinating Committee, community advisory committees, and a management and liaison office headed by an executive director. The Coordinating Committee membership includes one representative each from the Boards of Trustees of Oscoda, Au Sable, and Greenbush townships, one each from the Boards of Commissioners of Iosco and Alcona counties, and two from the Oscoda community at large, nominated by WAEAC. Representatives of the Governor, Wurtsmith AFB, and the DOD Office of Economic Adjustment participate as nonvoting members. WAEAC and the Oscoda Township Board of Trustees selected

The Pathfinders to prepare the community reuse plan. The Proposed Action is based on the final reuse plan developed by The Pathfinders and approved by the Oscoda Township Board of Trustees in December 1992.

Under the Proposed Action, some airfield facilities would be retained to support aircraft maintenance and refurbishing and general aviation activities. Commercial and light industrial redevelopment is proposed for the existing cantonment area. The Proposed Action would reuse existing facilities to the extent practicable; little new facility construction is planned. Other land use components in the Proposed Action include convention/tourist center, residential, and public facilities/recreation. Figure 2.2-1 illustrates the Proposed Action land uses and Table 2.2-1 lists these land use components and their approximate acreages. (All acreages presented in the text are approximate.)

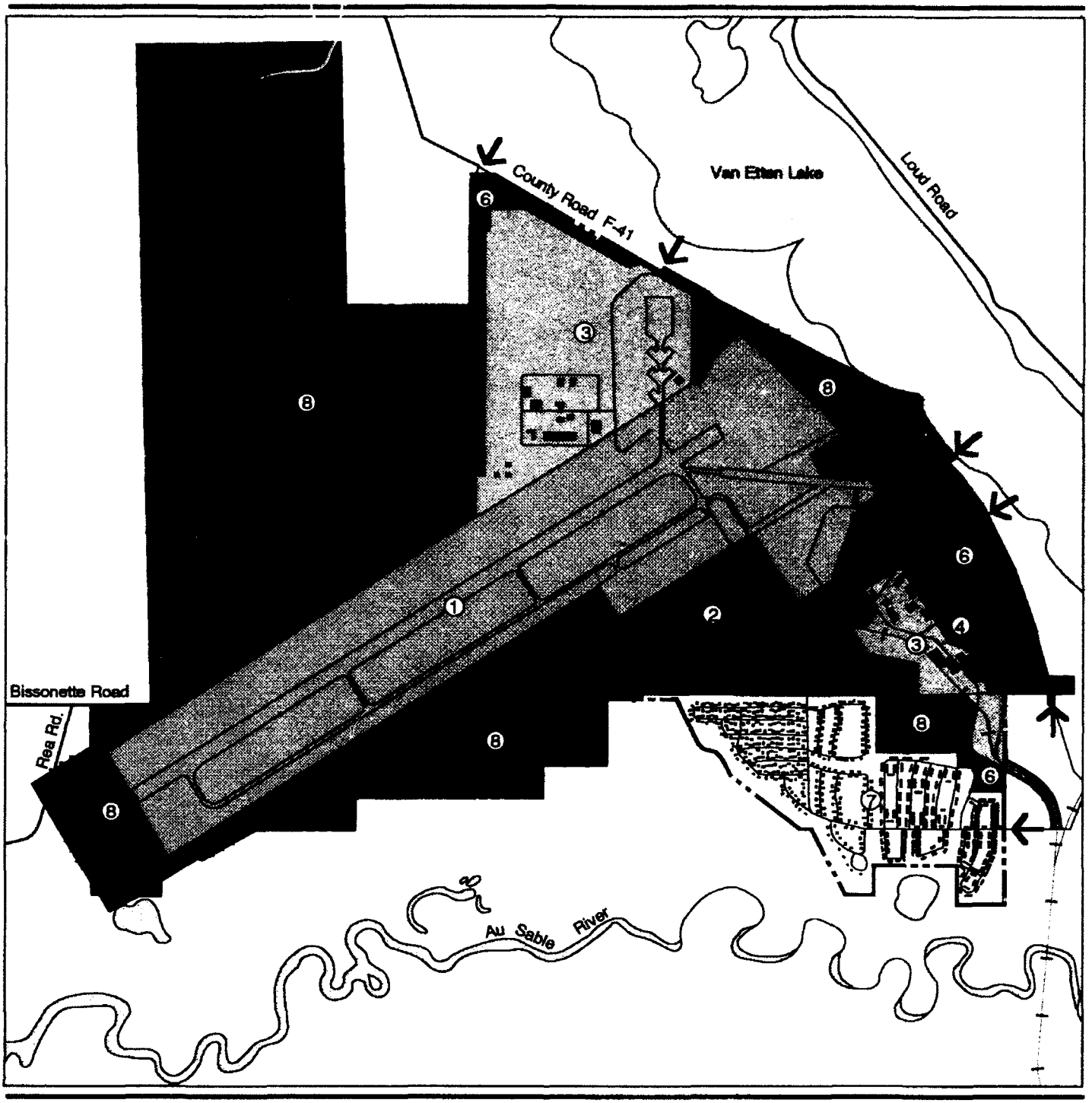
Table 2.2-1. Land Use Acreage - Proposed Action

Land Use	Acreage
Airfield	1,025
Aviation support	275
Industrial	489
Institutional	12
Commercial	216
Residential	354
Public facilities/recreation	2,255
Total	4,626

For all land uses, the Proposed Action assumes relatively rapid redevelopment in the period 1993-1998, moderate development from 1998 to 2003, and little development thereafter. Reuse of facilities is anticipated to be similar to existing uses, and no major facility renovations are planned. The proposed amount of development, including existing facility demolition and retention and new facility construction for each land use under the Proposed Action, is presented in Table 2.2-2. The acreages within each land use assumed to be disturbed as a result of facility construction, demolition, or renovation and infrastructure improvements under the Proposed Action are presented in Table 2.2-3 for the three periods of analysis.

2.2.1 Airfield

The WAEAC has prepared a preliminary ALP (Figure 2.2-2) for submittal to the FAA, using FAA Advisory Circular 150/5300-13, Airport Design. This plan was used for the purposes of this environmental analysis.



EXPLANATION

- ① Airfield
- ② Aviation Support
- ③ Industrial
- ④ Institutional (Medical)
- ⑤ Institutional * (Education)
- ⑥ Commercial
- ⑥ Convention/ Tourist
- ⑦ Residential
- ⑧ Public Facilities/ Recreation
- ⑧ Recreational Vehicle Park
- ⑨ Agriculture *
- ⑩ Vacant Land *
- Base Boundary
- Access Points

0 750 1500 3000 Feet

* Not Applicable

Note: Figure 1.2-1 shows Air Force fee-owned property.

Proposed Action

Figure 2.2-1

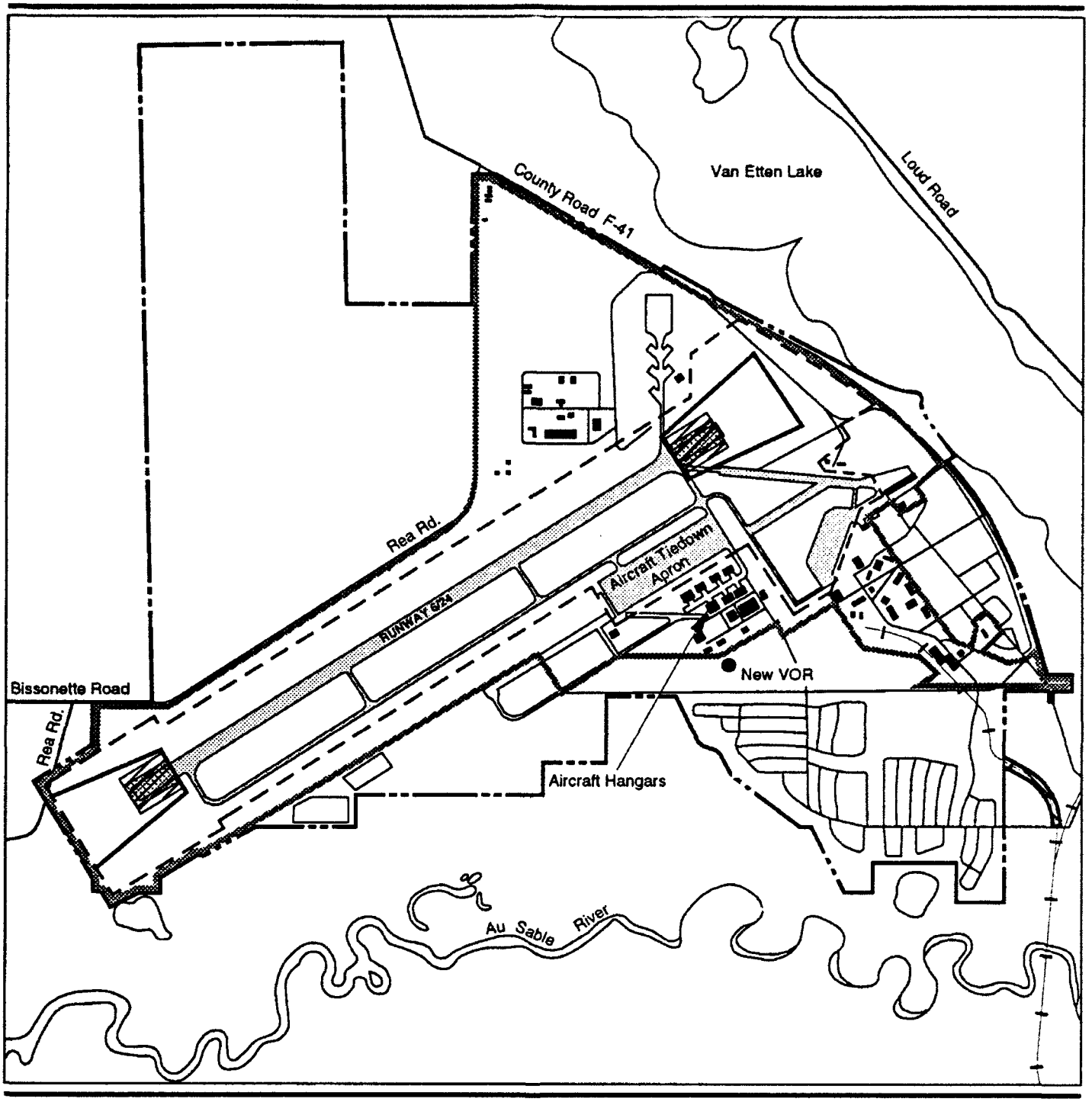
Table 2.2-2. Facility Development - Proposed Action

Land Use	Existing Facility Demolition	Existing Facility Retention	New Facility Construction
	(thousands of square feet of floor space)		
Airfield	0	0	0
Aviation support	0	465	100
Industrial	87	250	0
Institutional	4	113	0
Commercial	19	577	100
Residential	175	2,444	0
Public facilities/ recreation	21	5	0
Total	306	3,854	200

Table 2.2-3. Acres Disturbed - Proposed Action

Land Use	Acres Disturbed (by phase)			
	1993-1998	1998-2003	2003-2013	Total
Airfield	50	0	0	50
Aviation support	15	8	6	29
Industrial	55	14	12	81
Institutional	0	0	0	0
Commercial	19	17	5	41
Residential	36	25	11	72
Public facilities/ recreation	255	23	0	278
Total	430	87	34	551

The proposed airfield land use area contains 1,025 acres, or 22 percent of the total base acreage. It encompasses the existing 11,800-foot by 300-foot runway, parallel taxiway A, four connecting lateral taxiways, runway protection zones (RPZs), and the operational aprons. The hydrant fuel system would not be used; aviation fuel would be brought in by truck to support operations. This alternative assumes that an aircraft refurbishing and maintenance facility would locate at Wurtsmith AFB. A full-service Fixed Base Operator (FBO) would locate at the airport to provide general aviation functions and services.



EXPLANATION

- Base Boundary
- Airport Boundary
- Building Restriction Line
- Airfield Pavement

1750' 1000' 2500' Runway Protection Zone

800' 1000' Runway Object Free Area

500' 1000' Runway Safety Area

0 750 1500 3000 Feet

Note: Figure 1.2-1 shows Air Force fee-owned property.

Preliminary Airport Layout Plan - Proposed Action

Figure 2.2-2

The entire runway would be maintained to support reuse operational requirements. The RPZs are areas at the end of the runway that are kept free of development, except for navigational aids, for added safety during aircraft arrivals and departures. Lateral safety zones necessary for the proposed operations include building restriction areas, RPZs, obstacle-free areas, and runway/taxiway safety areas.

General aviation activity would constitute the majority of flight operations under the Proposed Action at Wurtsmith AFB. General aviation activities anticipated include corporate flying, private or pleasure flying, and instructional flying. Additional projected airport operations include flights by large commercial and/or cargo aircraft arriving for maintenance and refurbishing.

Table 2.2-4 presents the projected flight operations assumed for this alternative for the periods 5, 10, and 20 years after closure (1998, 2003, and 2013, respectively). All aircraft listed in Table 2.2-4 for the years 2003 and 2013 meet the FAA's Stage 3 noise standard. The change in aircraft from 1998 to 2013 reflects the varying aircraft types that would likely need refurbishing at those times.

Approximately 90 percent of all aviation operations are assumed to occur between 7 a.m. and 10 p.m.; the remaining 10 percent would occur between 10 p.m. and 7 a.m.

An airport authority with responsibility for the overall redevelopment and operation of Wurtsmith AFB has not been identified at this time; however, the WBCA is exploring the possibility of assuming that role.

The flight tracks utilized by Wurtsmith AFB aircraft to transition to and from the area airspace will be eliminated upon closure. New flight tracks consisting of a straight arrival/departure path to each end of the runway would be instituted. Additionally, a closed left and right traffic pattern would be created for each runway.

No airfield improvements are proposed for this action. The FAA plans to build a new very-high frequency omnidirectional range (VOR) at the airfield, to be operational in late 1993. The existing operational apron would be reconfigured to accommodate parking of general aviation aircraft. Airfield lighting would be retained in this action, as would navigational aids.

2.2.2 Aviation Support

The proposed aviation support area encompasses 275 acres, or approximately 6 percent of the total base area. Reuse activities would be limited to aircraft maintenance and refurbishing services and small to moderately sized general aviation based aircraft service. These activities

Table 2.2-4. Projected Flight Operations - Proposed Action

Year	Operations	Stage	%	Fleet Mix	Annual Operations[a]
1998	General Aviation	NA	83	Single-engine piston	13,770
		NA	6	Multiengine piston	1,070
		NA	1	Turboprop	150
		3	2	Turbojet	310
		2	<1	727-100	48
		2	2	727-200	288
		3	1	747-200	144
		2	<1	DC-9	72
		1	1	DC-8-50	192
		3	<1	MU-2	72
		3	2	Lear 35	240
		NA	2	Beech KingAir	288
				Total	16,644
2003	General Aviation	NA	83	Single-engine piston	15,660
		NA	6	Multiengine piston	1,220
		NA	1	Turboprop	170
		3	2	Turbojet	350
		3	2	727-200 (re-engined)	288
		3	1	747-400	216
		3	<1	MD-81	72
		3	1	DC-8-70	144
		3	<1	MU-2	96
		3	1	Lear 35	240
		NA	2	Beech KingAir	336
				Total	18,792
2013	General Aviation	NA	83	Single-engine piston	18,870
		NA	7	Multiengine piston	1,480
		NA	2	Turboprop	420
		3	2	Turbojet	420
		3	1	727-200 (re-engined)	192
		3	1	747-400	336
		3	<1	DC-8-70	96
		3	1	MU-2	192
		3	1	Lear 35	240
		NA	2	Beech KingAir	384
				Total	22,630

Note: (a) An operation is defined as a landing or a takeoff.

could be accommodated in existing facilities adjacent to, and southeast of, the apron. This area contains approximately 465,000 square feet of floor space in hangars, offices, warehouses, and aviation-related and industrial facilities.

The area west of the existing aviation support facilities is proposed for future expansion of aviation-related development. This 100-acre area is situated generally parallel to the runway and taxiways and contains the fire station, control tower, a heated vehicle parking facility, and several thousand linear feet of taxiway. Some of these facilities would be used immediately, and future new development would occur here first. The existing aviation support area to the east incorporates the jet engine test cell, converted hangars, two fire stations, and maintenance shops. This area could support transitional development between aviation-related and commercial development abutting on the southeast. Construction of an additional 100,000 square feet of floor space for aviation-related manufacturing is proposed for this area.

2.2.3 Industrial

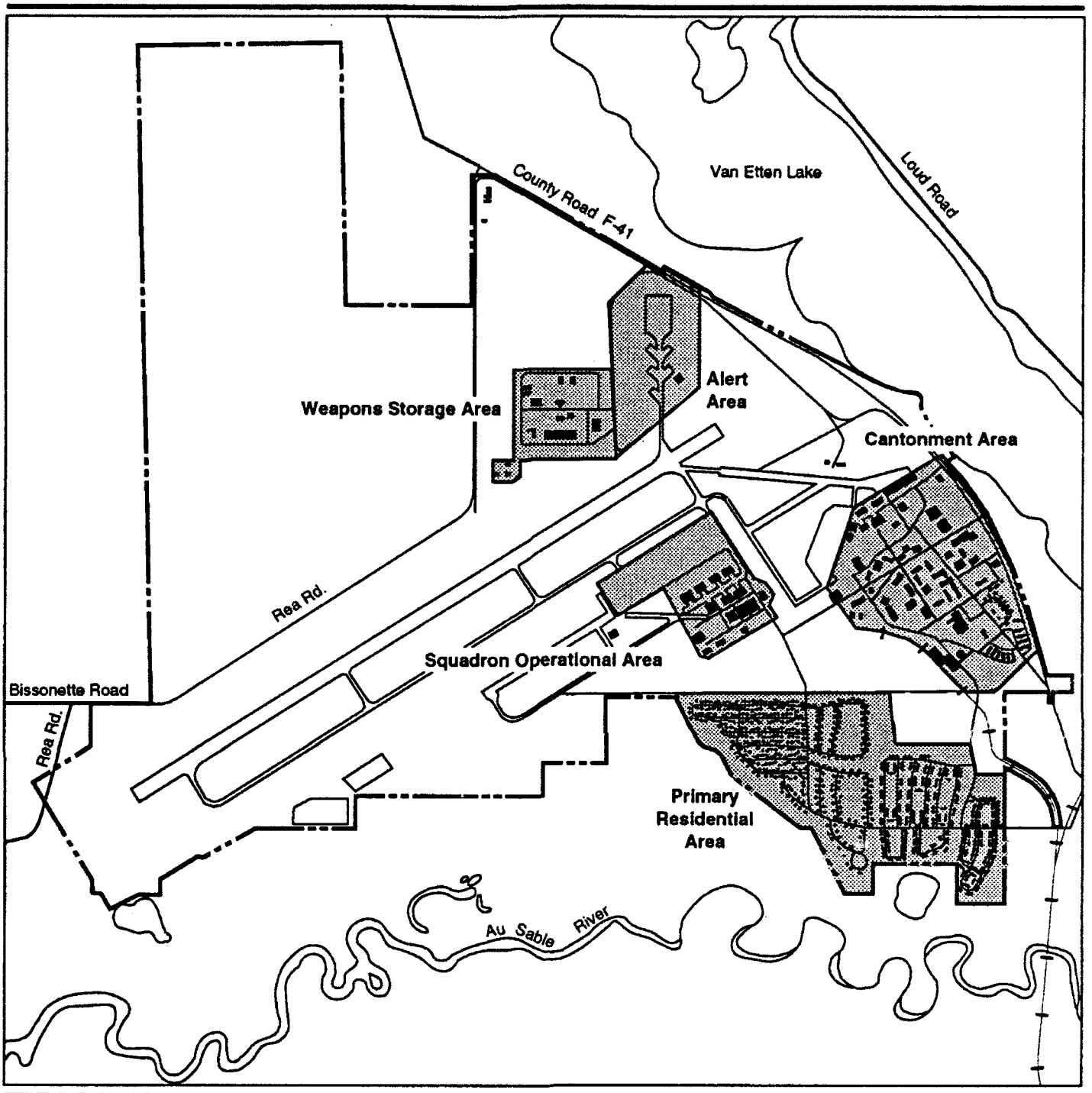
The industrial land use areas would encompass 489 acres, which is approximately 11 percent of the total base area. Proposed uses in these areas include light industrial, warehousing, and light manufacturing. Under the Proposed Action, the rail spur would be extended north through industrial, commercial, and aviation support land use areas to provide rail access for future activities.

The southern industrial area covers 87 acres on both sides of the rail spur in the cantonment area (Figure 2.2-3). This area includes warehouses and maintenance and administrative facilities, which would be put to similar uses for the Proposed Action.

The northern industrial area, encompassing 402 acres, contains the Weapons Storage Area (WSA) and the alert area with its associated parking aprons. Facilities in the WSA would be used for storage, maintenance, and light industrial uses. The adjacent alert area includes facilities suitable for use for small seminar groups, and space for future industrial development (after the 20-year analysis period).

2.2.4 Institutional

The proposed institutional land use area includes the existing base hospital, which would be reused as a medical facility to provide limited outpatient care (pharmacy, emergency, medical/dental clinic, etc.). The facilities proposed for medical-related uses contain about 113,000 square feet on 12 acres.



EXPLANATION

Base Boundary

Developed Areas On Base

0 750 1500 3000 Feet

Figure 2.2-3

2.2.5 Commercial

Approximately 5 percent (216 acres) of the total base acreage is proposed for various commercial uses. Commercial land uses would include office, retail (including crafts industries), and convention/tourist services. The office component covers 17 acres containing about 100,000 square feet of existing office space to supply a variety of educational, financial, service, administrative, and other reuse office needs.

The retail component would encompass 42 acres, containing about 30,000 square feet of retained facilities in three areas. The 12-acre commercial retail area at the intersection of County Road F-41 and Rea Road includes the Security Police kennels and the Defense Reutilization and Marketing Office (DRMO) storage facilities. The 8-acre parcel northeast of the existing family housing area contains the housing management office, a day care center, and a base exchange convenience store. The remaining acreage is in the Main Gate area.

The Proposed Action includes a 157-acre area designated for convention/ tourist uses. This area encompasses most of the eastern cantonment area and includes a variety of facilities proposed to support a program of year-round events, major attractions, and educational programs. These facilities include the Commissary, Base Exchange, Officers' Club, airmen's dining hall, dormitories, family housing, most of the recreation facilities, and the Community Center. Construction of an additional 100,000 square feet of floor space for commercial uses is proposed for this area.

2.2.6 Residential

The residential land use area would contain 354 acres, or 8 percent of the total base area. Approximately 10 percent of the existing residential units may be demolished or removed to reduce the density in the westernmost portion of the residential area. About 1,100 single-family and multi-family dwelling units would be retained for use as single-family residences, retirement homes, second/vacation homes, tourist lodging, and public/ institutional housing.

2.2.7 Public Facilities/Recreation

In the Proposed Action, 48 percent (2,255 acres) of the base would be retained for public facilities, open space, and recreation uses. This acreage includes 132 acres of outdoor athletic and recreation facilities, 92 acres of recreational vehicle park, and 2,031 acres of open space, dominating the western half of the base. In addition to the existing uses on these lands, potential uses include natural open space, reforestation and land use buffering, undeveloped or passive recreation, developed (intensive) recreation facilities, or local parks/monuments. Outdoor facilities, including

baseball/softball and soccer/football fields, and a running track, are concentrated in an area north of the existing military family housing, west of the cantonment. The small arms range just north of the runway would likely be reused as a public firing range.

The large public facilities/recreation area in the northwestern part of the base encompasses forest and wetland areas outside the base security fence and contiguous with the Au Sable State Forest. Much of this area has remained relatively undisturbed by base activities, and offers valuable habitat for many wildlife species (see Section 3.4.5, Biological Resources). Under the Proposed Action, this area would be left undeveloped as a conservation area.

2.2.8 Employment and Population

The direct reuse-related employment generated for the operations phase of the Proposed Action for the 20-year period is estimated to total 4,285. The on-site population increase is estimated at 2,196. Employment and population effects are presented in Table 2.2-5.

Table 2.2-5. Site-Related Employment and Population Effects - Proposed Action

	Closure	1998	2003	2013
Direct employment	50	2,938	3,461	4,285
On-site population	0	1,098	1,867	2,196

2.2.9 Transportation

County Road F-41 is expected to be the major route to the developed portions of the base, with access points at the Main Gate, Arrow Street, Van Etten Street, the proposed commercial/industrial area (existing alert apron), the northernmost commercial area, and Capehart Gate leading to the residential area. Access to the southern portion of the base from River Road is blocked by the Au Sable River. Roadway improvements would be accomplished where local development plans dictate a need based on community standards for acceptable levels of service. Based on land use and employment projections, average weekday vehicular traffic to and from base property would be approximately 29,600 by 2013.

2.2.10 Utilities

On-site utility usage in 2013 from the activities associated with the Proposed Action would be:

- Water - 0.5 million gallons per day (MGD)
- Wastewater - 0.33 MGD
- Solid waste - 13.4 tons per day
- Electricity - 67 megawatt hours (MWH) per day
- Natural gas - 9.4 thousand therms per day.

2.3 DESCRIPTION OF ALTERNATIVES

Several constraints and opportunities were identified that had to be considered in developing reasonable reuse alternatives. Constraints included:

- The presence of wetlands, inactive landfills, and potentially hazardous groundwater contamination areas
- Undeveloped areas in the western half of the base that lack adequate access or infrastructure to support development
- Infrastructure systems that need improvement, precluding inexpensive reuse of otherwise suitable facilities
- The large size of some facilities, which would make most civilian uses inefficient.

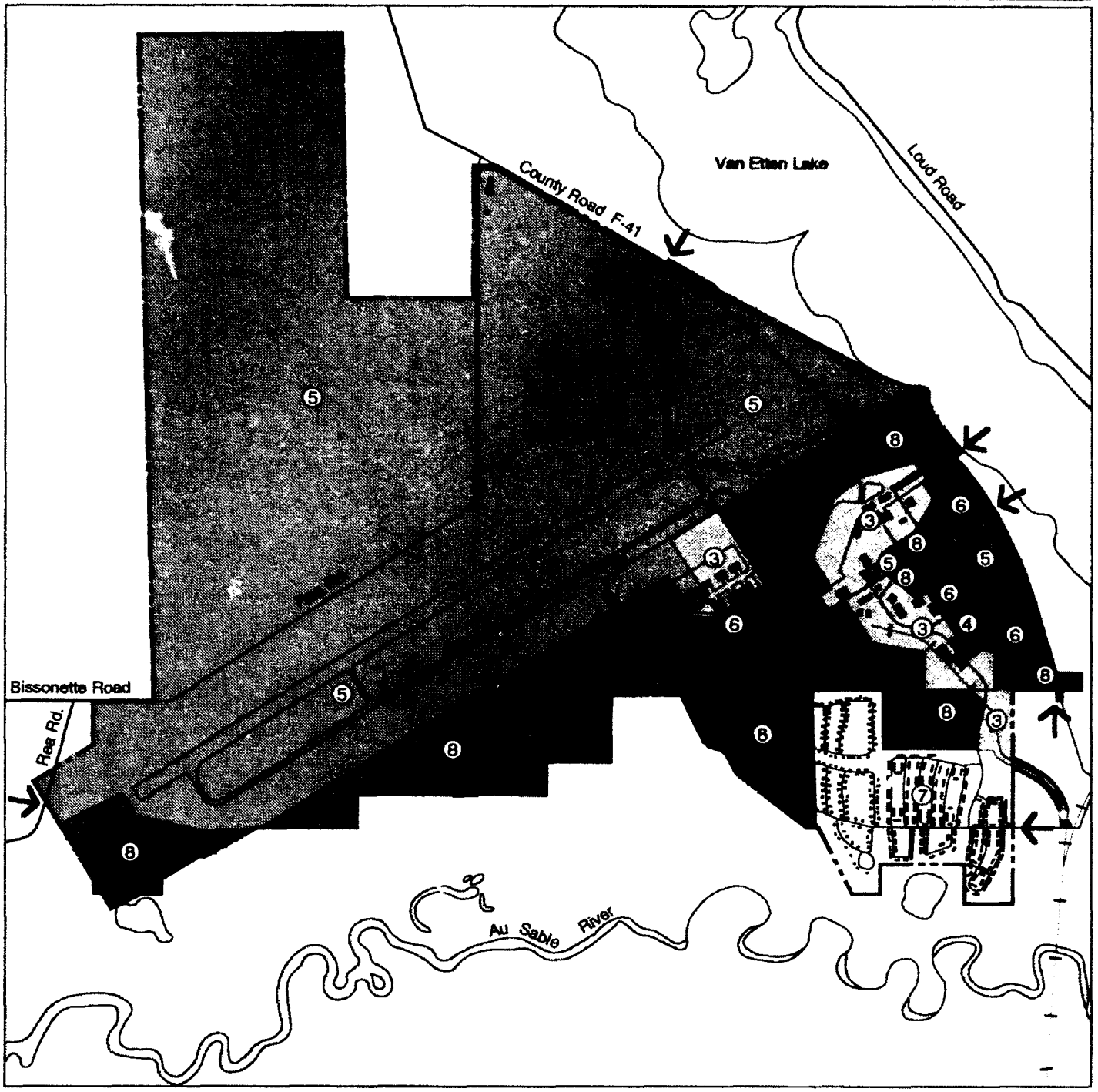
Development opportunities included:

- An attractive, campus-like cantonment area of well maintained, mixed-use facilities suitable for commercial/industrial development
- A corridor of land, varying in width from a few hundred to a few thousand feet, along the west side of County Road F-41 that provides access and development potential for commercial uses
- A 4-mile strip along the Au Sable River that provides natural open space and access adjacent to federal and state forest lands for future recreational development.

2.3.1 Fire Training Alternative

Under the Fire Training Alternative (Figure 2.3-1), the runway and all base property to the northwest would be used for a regional fire training facility. Commercial and industrial development are proposed for the existing cantonment and aviation support areas, and most of the existing residential areas would be retained.

Major land use components proposed for the Fire Training Alternative include institutional (educational and medical), light industrial and warehousing, commercial office and retail, existing residential, and public facilities/



EXPLANATION

- ① Airfield*
- ② Aviation Support*
- ③ Industrial
- ④ Institutional (Medical)
- ⑤ Institutional (Education)
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public Facilities/ Recreation
- ⑨ Agriculture *
- ⑩ Vacant Land *
- Base Boundary
- Access Points

0 750 1500 3000 Feet

* Not Applicable

Note: Figure 1.2-1 shows Air Force fee-owned property.

Fire Training Alternative

Figure 2.3-1

recreation. Table 2.3-1 lists the land use components comprising the Fire Training Alternative with their approximate acreages.

Table 2.3-1. Land Use Acreage - Fire Training Alternative

Land Use	Acreage
Industrial	234
Institutional	3,127
Commercial	130
Residential	250
Public facilities/recreation	885
Total	4,626

Under the Fire Training Alternative, rapid development in the industrial, commercial, and institutional land use areas is projected to occur within the first 5 years after closure, leveling off after 1998. The public facilities/ recreation areas would be fully developed for reuse by 2003. Reuse of facilities is anticipated to be similar to existing uses, and limited facility renovations are planned. The proposed amount of development, including existing facility demolition and retention and new facility construction, for each land use under the Fire Training Alternative, is presented in Table 2.3-2. The acreages within each land use assumed to be disturbed under the Fire Training Alternative are presented in Table 2.3-3 for the three periods of analysis.

Table 2.3-2. Facility Development - Fire Training Alternative

Land Use	Existing Facility Demolition	Existing Facility Retention	New Facility Construction
	(thousands of square feet of floor space)		
Industrial	33	753	152
Institutional	53	522	31
Commercial	116	552	253
Residential	201	1,828	0
Public facilities/ recreation	31	71	0
Total	434	3,726	436

2.3.1.1 Industrial. Industrial reuse in the Fire Training Alternative is proposed in two areas encompassing a total of 234 acres, or 5 percent of the base area. An area similar to that under the Proposed Action is in the existing industrial area of the cantonment, and includes acreage along the rail spur to provide rail access to future industrial development, if needed.

Table 2.3-3. Acres Disturbed - Fire Training Alternative

Land Use	Acres Disturbed (by phase) 1993-1998	1998-2003	2003-2013	Total
Industrial	15	15	13	43
Institutional	101	53	50	204
Commercial	11	7	27	45
Residential	8	6	12	26
Public facilities/ recreation	27	6	0	33
Total	162	87	102	351

This large industrial parcel includes the former squadron operational area northwest of the cantonment. This area contains several former aircraft maintenance hangars that have been converted to non-aviation warehousing uses, communications and technical laboratories, two fire stations, administrative offices, the jet engine test cell, and maintenance shops. The former aircraft parking apron and an area northeast of the gymnasium would be available for new industrial development.

The second area proposed for planned industrial redevelopment would occupy 50 acres in the Air Combat Command (ACC) operations apron area. The proposed reuse of this area would involve approximately 150,000 square feet of industrial floor space through conversion of existing hangars.

2.3.1.2 Institutional. The Fire Training Alternative proposes 3,127 acres, or nearly 68 percent of the base, for educational and medical uses (see Figure 2.3-1).

The largest institutional area would encompass 3,075 acres in the northwestern half of the base to support a regional fire training facility operated by the Great Lakes Fire Training Academy. Large areas would be required to provide space for maneuvering aircraft rescue and fire fighting vehicles, burn areas, support facilities, and buffer zones to other land uses. Fire training activity areas would include the alert apron, WSA facilities, the entire runway, parallel taxiway, and the open space between them. Access would be from County Road F-41 and Rea Road. Existing facilities within the WSA could be reused to provide storage, administrative space, and maintenance support for training operations. The Alert/Readiness Crew Facilities and Burkhart Hall, a six-unit residential facility, would be used as housing for an estimated 30 students.

The regional fire training academy would provide a variety of hands-on and classroom programs for training fire-fighting personnel. Structural and industrial fire mock-ups would be prepared along the southwestern portion

of the runway and parallel taxiway. Liquefied petroleum gas, rather than kerosene, would be used as a fuel to reduce air emissions from the fires. A pump station, water retention pond, and treatment station would be constructed in the area between the runway and the taxiway. All fire fighting training activities would be conducted on bermed concrete pads; the runoff would be channeled through an aboveground collection system and passed through an oil/water separator before discharging into the double-walled, 10-million-gallon retention pond. The water in the retention pond would be reused.

Other fire training activities would include search and rescue operations, aircraft crash operations on the operational apron, fire and medical vehicle training north of the WSA, and forest fire training on the explosive ordnance disposal (EOD) and grenade launching ranges. The forest fire training activities would be conducted about once per year, in conjunction with the Michigan Department of Natural Resources (MDNR) and U.S. Forest Service. Each prescribed fire would burn approximately 1 to 2 acres. The large forested area in the northwestern part of the base is included within the boundaries of the fire training academy, but most of this area would be left undisturbed as a buffer area around fire training operational areas.

The proposed community education area occupies 7 acres in the cantonment and contains approximately 40,000 square feet of floor space, including the existing education center facilities. About one-third of the existing structures would be demolished and about 25,000 square feet of new educational facilities with ancillary parking and landscaping would be constructed. Possible uses of these facilities include various vocational, technical, or university-extension classes.

The 33-acre parcel in the existing cantonment would support private institutional uses, such as church or community group seminars, camps, and retreats. Facilities in the Community Center and the Officer's Club would be available for reuse. This area contains about 150,000 square feet of existing facilities; little demolition and no new construction are proposed.

The fourth institutional land use area includes the base hospital, to be reused for limited outpatient care (pharmacy, emergency, medical/dental clinic, etc.). The facility contains about 117,000 square feet on 12 acres.

2.3.1.3 Commercial. Approximately 3 percent (130 acres) of the total base area is proposed for various commercial uses. This area includes 31 acres for commercial retail use in the Commissary/Base Exchange area. Approximately 95,000 square feet of retained facilities would be augmented with an additional 25,000 square feet of new development. This component could be considered a regional convention/trade show/events center, with small retail services in the vicinity.

About 165,000 square feet of existing maintenance shops and commercial office space on 21 acres in the operational area southeast of the hangars would be reused. Other facilities in this area include classrooms, administrative offices, and an 80,000-square-foot aircraft maintenance shop.

A commercial office park is proposed on a 54-acre area that provides prime frontage along both County Road F-41 and a proposed new east-west arterial. This complex would consist of planned office development that would provide an anchor for related development. Over 150,000 square feet of residential housing and administrative office space would be demolished and replaced with over 200,000 square feet of new office floor space. The Base Headquarters would be reused as commercial offices. The Non-Commissioned Officers' (NCO) Club would be retained as a commercial retail (service-restaurant) facility.

The Fire Training Alternative proposes development of a hotel on 23 acres designated as commercial area, intended for seasonal tourist overflow or to support convention center or trade show activities. Nearly 275,000 square feet of existing dormitories and the dining hall would be retained; 45,000 square feet of dormitory space would be demolished and additional parking areas provided.

2.3.1.4 Residential. The proposed residential land use includes 250 acres, or about 5 percent of the total base area. Demolition is proposed for all of the residential units southwest of Perimeter Road and Mission Drive. The remaining 855 family housing units in the southeastern part of the base would be retained for use as permanent, seasonal, and retirement homes.

2.3.1.5 Public Facilities/Recreation. Approximately 19 percent (885 acres) of the total base area would be retained for public facilities, open space, and recreation uses. This acreage includes 83 acres of indoor and outdoor athletic and recreation facilities, 70 acres of local community parks, and 732 acres of open space along the southwestern base boundary and separating the cantonment and residential areas from fire training areas.

2.3.1.6 Employment and Population. The direct reuse-related employment generated for both construction and operations phases for the Fire Training Alternative for the 20-year period is estimated to total 2,498. The on-site population increase is estimated at 1,383. Employment and population effects are presented in Table 2.3-4.

Table 2.3-4. Site-Related Employment and Population Effects - Fire Training Alternative

	Closure	1998	2003	2013
Direct employment	50	1,308	1,876	2,498
On-site population	0	262	609	1,383

2.3 1.7 Transportation. As in the Proposed Action, County Road F-41 is expected to provide the major route to the base, via accesses at the Main Gate, Arrow Street, Van Etten Street, the alert area, and Capehart Gate leading to the residential area. Based on land use and employment projections, average weekday vehicular traffic to and from base property would be approximately 26,100 by 2013.

2.3.1.8 Utilities. On-site utility usage in 2013 from the activities of the Fire Training Alternative would be:

- Water - 0.38 MGD
- Wastewater - 0.23 MGD
- Solid waste - 9 tons per day
- Electricity - 66 MWH per day
- Natural gas - 6.2 thousand therms per day.

2.3.2 Recreation Alternative

The focus of the Recreation Alternative (Figure 2.3-2) is restoration and conservation of natural open space for potential multi-use recreation development. Commercial, light industrial, and institutional reuses are proposed in the main base area on a smaller scale than in the other two alternatives. Over 50 percent of the existing structures would be demolished and very little construction is proposed.

Major land use components for the Recreation Alternative would include public facilities/recreation, light industrial and warehousing, public and private institutional education, residential, and commercial retail. Table 2.3-5 lists the proposed land use components comprising the Recreation Alternative with their approximate acreages.

Table 2.3-5. Land Use Acreage - Recreation Alternative

Land Use	Acreage
Industrial	193
Institutional	60
Commercial	62
Residential	92
Public facilities/recreation	4,219
Total	4,626

Under the Recreation Alternative, approximately two-thirds of the planned industrial, commercial, residential, and institutional land use development is assumed to occur prior to 2003. The public facilities/recreation areas would be fully developed for reuse by 2003. Reuse of facilities is anticipated to be

EXPLANATION

- ① Airfield*
- ② Aviation Support*
- ③ Industrial
- ④ Institutional (Medical)
- ⑤ Institutional (Education)
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public Facilities/ Recreation
- ⑧ Recreational Vehicle Park
- ⑨ Agriculture *
- ⑩ Vacant Land *
- Base Boundary
- Access Points

0 750 1500 3000 Feet

* Not Applicable

Note: Figure 1.2-1 shows Air Force fee-owned property.

Recreation Alternative

Figure 2.3-2

similar to existing uses, and no major facility renovations are planned. The proposed amount of development, including existing facility demolition, retention, and new facility construction for each land use under the Recreation Alternative is presented in Table 2.3-6. The acreages within each land use assumed to be disturbed under the Recreation Alternative are presented in Table 2.3-7 for the three periods of analysis.

Table 2.3-6. Facility Development - Recreation Alternative

Land Use	Existing Facility Demolition	Existing Facility Retention	New Facility Construction
	(thousands of square feet of floor space)		
Industrial	56	621	0
Institutional	25	512	0
Commercial	2	296	49
Residential	0	201	0
Public facilities/ recreation	2,293	154	6
Total	2,376	1,784	55

Table 2.3-7. Acres Disturbed - Recreation Alternative

Land Use	Acres Disturbed (by phase)			
	1993-1998	1998-2003	2003-2013	Total
Industrial	8	4	17	29
Institutional	7	1	0	8
Commercial	3	10	17	30
Residential	1	2	3	6
Public facilities/ recreation	445	0	96	541
Total	464	17	133	614

2.3.2.1 Industrial. Industrial reuse in the Recreation Alternative, comprising about 193 acres, or 4 percent of the total base acreage, is proposed in three areas. One 46-acre parcel is located along the rail spur south of Arrow Street, configured similarly to the area in the Proposed Action. The second parcel includes the WSA and the southern portion of the alert area. The third parcel includes all of the hangars and aircraft maintenance shops adjacent to the squadron operations area, southeast of the runway.

2.3.2.2 Institutional. Institutional land use would constitute slightly over 1 percent (60 acres) of the total base acreage. The proposed community educational area covers 7 acres and contains the education center/youth facility. Private institutional use similar to that under the Fire Training Alternative is proposed for the 40-acre area containing the base Community

Center, the Officers' Club, the dormitories, and dining hall. About 355,000 square feet of existing facility space would be reused; little demolition and no new construction are proposed. Use of the 12-acre area containing the medical facility would be the same as discussed under the Fire Training Alternative.

2.3.2.3 Commercial. Slightly more than 1 percent (62 acres) of the total base acreage is proposed for various commercial uses. A 29-acre parcel for commercial retail use in the Commissary/Base Exchange area contains approximately 160,000 square feet of retained facilities. This space would be augmented with an additional 5,000 square feet of new retail development. Approximately 50,000 square feet of office space on 8 acres containing the CE facilities would be reused as commercial office space. A 12-acre commercial office park would be located adjacent to the existing base supply warehouse and the NCO Club. The wing/squadron operation offices, classrooms, and flight si 'ator building, occupying a 13-acre parcel southeast of the operational apro . .ould be reused as commercial offices.

2.3.2.4 Residential. The proposed residential area in the Recreation Alternative is considerably smaller than that of the other alternatives, occupying about 2 percent (92 acres) of the total base area. Forty duplex and fifteen single-family units, all with garages, would be retained for reuse as permanent and seasonal homes.

2.3.2.5 Public Facilities/Recreation. Over 90 percent (4,219 acres) of the total base area would be retained for public facilities, open space, and recreation uses. This acreage includes 90 acres of indoor and outdoor athletic or recreation facilities, 90 acres of local community parks, a proposed 120-acre golf course, and over 3,900 acres of open space. Recreation activities in these areas would most likely include camping, hiking, hunting, picnicking, and similar uses. As in the Proposed Action, the large forested area in the northwestern part of the base would remain undeveloped as a conservation area.

2.3.2.6 Employment and Population. The reuse-related employment generation for both construction and operations phases for the Recreation Alternative is the smallest of the three alternatives, reflecting minimal redevelopment. Direct employment for the 20-year period is estimated to total 1,473. The on-site population increase, including 160 higher education students, is estimated at 269. Employment and population effects are presented in Table 2.3-8.

Table 2.3-8. Site-Related Employment and Population Effects - Recreation Alternative

	Closure	1998	2003	2013
Direct employment	50	572	979	1,473
On-site population	0	137	212	269

2.3.2.7 Transportation. Under this alternative, access points at Arrow Street, Van Etten Street, and the alert area would be provided from County Road F-41, in addition to the existing Main Gate and Capehart Gate. Based on land use and employment projections, average weekday vehicular traffic to and from base property would be approximately 21,000 by 2013.

2.3.2.8 Utilities. On-site utility usage in 2013 from the activities of the Recreation Alternative would be:

- Water - 0.17 MGD
- Wastewater - 0.06 MGD
- Solid waste - 3.4 tons per day
- Electricity - 37 MWH per day
- Natural gas - 4.1 thousand therms per day.

2.3.3 No-Action Alternative

The No-Action Alternative would result in the U. S. Government retaining ownership of the Air Force fee-owned property after closure. Non-fee-owned property would return to the lessee upon mutually agreed termination of the lease. The base property would not be put to further use, but would be preserved, i.e., placed in a condition intended to limit deterioration and ensure public safety. All base property would be placed in caretaker status. The Air Force would be responsible for caretaker activities on Air Force fee-owned land; it is assumed that other property owners would also maintain their property in caretaker status. Caretaker activities, whether by the Air Force or others, would consist of base resource protection, grounds maintenance, existing utilities operations as necessary, and building care. No other military activities/missions are anticipated to be performed on the property.

The future land uses and levels of maintenance would be as follows:

- Maintain structures to limit deterioration
- Isolate or deactivate utility distribution lines on base
- Provide limited maintenance of roads to ensure access
- Provide limited grounds maintenance of open areas to eliminate fire, health, and safety hazards.

The base would continue to fulfill its water requirements by pumping on-base well water, although the amount drawn would be significantly reduced. Nonessential water lines would be drained and shut off. Wastewater flows under caretaker status would be negligible or zero and temporary low-capacity systems would be installed. Solid waste generation on base would

likely be reduced to a negligible level under this alternative. The existing power and space-heating systems serving Wurtsmith AFB would likely be utilized at substantially reduced levels while the base is in caretaker status. Electrical power would be required for security lighting and other essential systems, and natural gas would probably be required during winter months to maintain minimal space heating in mothballed facilities. The central heating plant would probably be shut down.

2.3.4 Other Land Use Concepts

In compliance with the Federal Property and Administrative Services Act of 1949, the Air Force solicited proposals from other federal agencies regarding their interest in acquiring any lands or facilities identified for disposal at Wurtsmith AFB. To date, no formal proposals for federal transfers or other independent land use concepts have been identified for Wurtsmith AFB. However, one independent land use concept, the Advanced Environmental Technology Facility, is analyzed herein. This land use concept is not part of any integrated reuse plan, but could be initiated on an individual basis or in combination with any one of the reuse alternatives, including the Proposed Action.

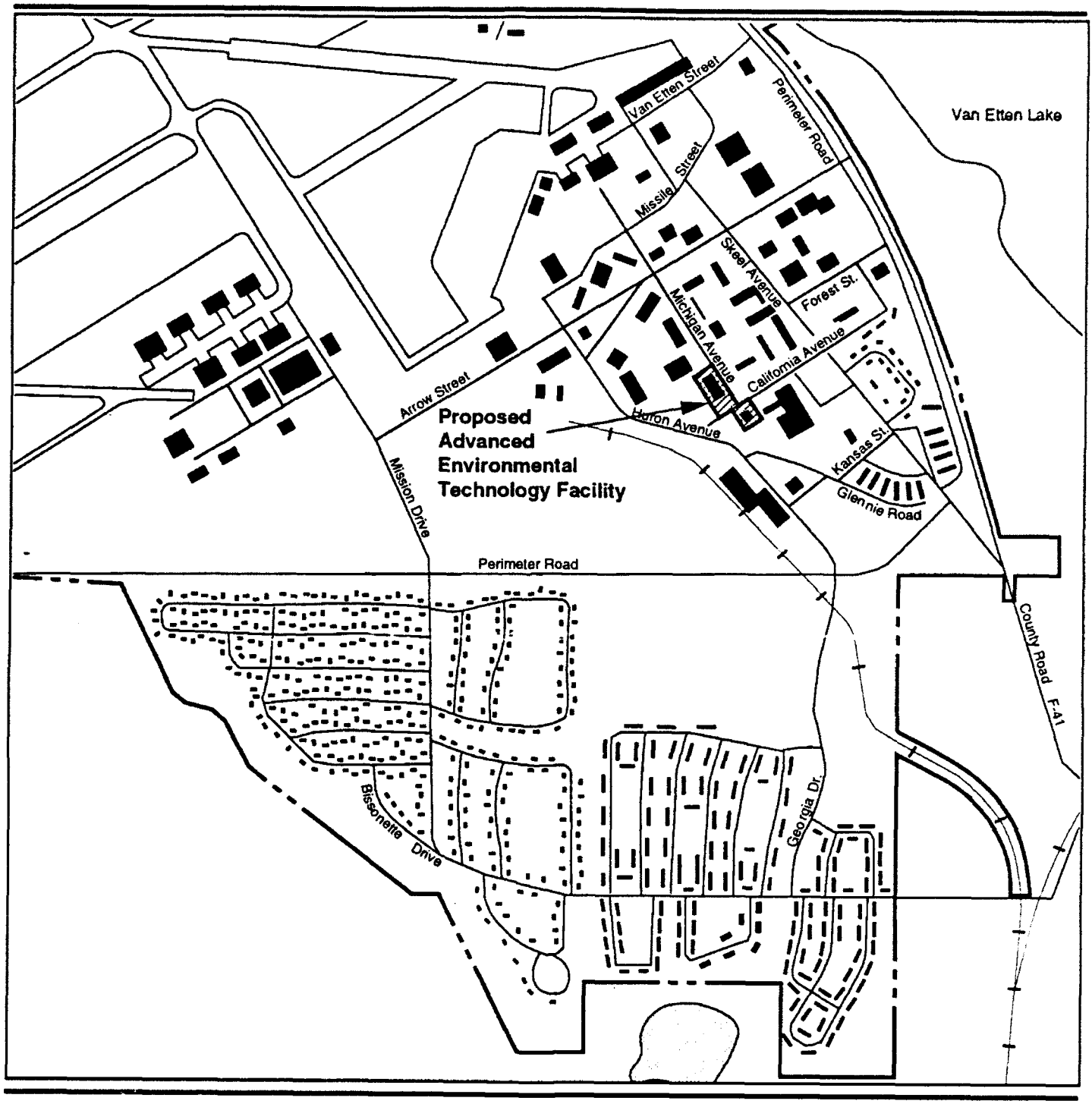
Advanced Environmental Technology Facility. The Great Lakes and Mid-Atlantic Hazardous Substance Research Center (GLMAC) is proposing to establish a national facility at Wurtsmith AFB for field research, development, and demonstration of advanced applied technologies for the decontamination and bioremediation of hazardous wastes, spills, and disposal sites. This facility would involve use of the bioenvironmental engineering laboratory, to conduct sample analysis, and the vehicle maintenance facility, to store vehicles and equipment (Figure 2.3-3). The facility staff and students would conduct on-site research at contaminated sites on the base. It is estimated that, over the 20-year analysis period, the facility would accommodate up to 20 direct permanent employees and up to 40 students per year, who would work at the facility temporarily (from 1 week to 3 months each).

2.4 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

To date, no other reuse proposals have been submitted for Wurtsmith AFB, nor has the Air Force identified other potential reuse alternatives.

2.5 INTERIM USES

Interim uses include predisposal short-term uses of the base facilities and property. Predisposal interim uses are conducted under lease agreements with the Air Force. The terms and conditions of the lease would be arranged to ensure that the predisposal interim uses do not prejudice future



EXPLANATION

Base Boundary

Proposed Advanced Environmental Technology Facility

Other Land Use Concepts

0 350 700 1400 Feet

Figure 2.3-3

disposal and reuse plans of the base. The continuation of interim uses would be arranged through agreements with the new property owner(s).

2.6 OTHER FUTURE ACTIONS IN THE REGION

No reasonably foreseeable actions have been identified that could be considered as contributing to a potential cumulative impact on the disposal and reuse of Wurtsmith AFB.

2.7 COMPARISON OF ENVIRONMENTAL IMPACTS

A summary comparison of the influencing factors and environmental impacts, along with their potential mitigations, on each biophysical resource affected by the alternatives over the 20-year study period is presented in Tables 2.7-1 and 2.7-2. Influencing factors are non-biophysical elements, such as population, employment, land use, aesthetics, transportation networks, and public utility systems that directly impact the environment. These activities have been analyzed to determine their effects on the environment. Impacts to the environment are described briefly in the summary and discussed in detail in Chapter 4. Table 2.7-3 presents influencing factors and environmental impacts of the independent land use concept.

Table 2.7-1. Summary of Reuse-Related Influencing Factors[a]

Factor	Proposed Action			Fire Training Alternative			Recreation Alternative			No-Action Alternative[b]
	1998	2003	2013	1998	2003	2013	1998	2003	2013	
Ground disturbance (acres by phase)	430	87	34	162	87	102	464	17	133	0
Aircraft operations (annual)	16,644	18,792	22,630	0	0	0	0	0	0	0
Direct employment	2,938	3,461	4,285	1,308	1,876	2,498	572	979	1,473	0
Local transfers	1,658	1,930	2,323	512	821	1,071	245	423	640	0
New jobs	185	216	259	58	92	120	28	48	72	0
Secondary employment	1,843	2,146	2,582	570	913	1,191	273	471	712	0
Local transfers	1,461	1,711	2,123	645	925	1,236	266	468	715	0
New jobs	1,477	1,750	2,162	663	951	1,262	306	511	758	0
Population increase	5,002	6,203	8,352	2,148	3,275	4,749	977	1,736	2,835	0
Traffic (total daily trips)	17,000	25,600	29,600	16,900	21,900	26,100	12,700	16,600	21,000	0
Increase in water demand (MGD)	0.48	0.60	0.81	0.21	0.32	0.46	0.10	0.17	0.28	0
Increase in wastewater production (MGD)	0.40	0.50	0.67	0.17	0.26	0.38	0.08	0.14	0.23	0
Increase in solid waste (tons/day)	9.6	11.9	16.0	4.2	6.3	9.2	1.9	3.4	5.5	0
Increase in electricity demand (MWH/day)	48.3	60.0	80.5	20.9	31.8	46.0	9.7	17.1	27.4	0
Increase in natural gas demand (thousand therms/day)	6.9	8.5	11.4	3.0	4.5	6.5	1.4	2.5	3.9	0

Notes: (a) Values shown represent change from projected No-Action Alternative conditions in each year as a result of implementing that alternative.
(b) The No-Action Alternative values summarize influencing factors relative to the projected closure conditions for each period of analysis.
MGD = million gallons/day.
MWH = megawatt hours.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Local Community				
• Land Use and Aesthetics	**Impacts:** • Potential minor land use conflicts between adjacent industrial and commercial uses. **Mitigations:** • Appropriate design and planning.	**Impacts:** • Potential minor land use conflicts between adjacent industrial and commercial uses. • Potential aesthetic conflict between fire training activities and local recreation and tourist activities. **Mitigations:** • Appropriate design and planning • Sensitive scheduling of fire training activities and use of visual buffers could minimize aesthetic effects.	**Impacts:** • Potential minor land use conflicts between adjacent industrial and commercial uses. **Mitigations:** • Appropriate design and planning.	**Impacts:** • Potential conflict with regional development goals.
• Transportation	**Impacts:** • Segments of U.S. 23 could drop to LOS F by 1998. • No airspace conflicts. **Mitigations:** • Road improvements could raise LOS to meet transportation planning criteria.	**Impacts:** • Segments of U.S. 23 could drop to LOS F by 1998. **Mitigations:** • Road improvements could raise LOS to meet transportation planning criteria.	**Impacts:** • Segments of U.S. 23 could drop to LOS F by 2003. **Mitigations:** • Road improvements could raise LOS to meet transportation planning criteria.	**Impacts:** • Segments of U.S. 23 would drop to LOS F by 2013.

LOS = Level of service.
U.S. = U.S. highway.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 2 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Local Community (Continued)				
• Utilities Demand	**Impacts:** • Requires connection of on-base water and wastewater systems to local systems. ROI capacity is sufficient.	**Impacts:** • Requires connection of on-base water and wastewater systems to local systems. ROI capacity is sufficient.	**Impacts:** • Requires connection of on-base water and wastewater systems to local systems. ROI capacity is sufficient.	**Impacts:** • No impact on local utility systems.
Hazardous Materials and Hazardous Waste Management				
• Hazardous Materials Management	**Impacts:** • Moderate increase in types and quantities of materials. No impact with proper management.	**Impacts:** • Moderate increase in types and quantities of materials. No impact with proper management.	**Impacts:** • Small increase in types and quantities of materials. No impact with proper management.	**Impacts:** • Small quantities used by OL. No impact.
• Hazardous Waste Management	**Impacts:** • Moderate increase in types and quantities of wastes. No impact with proper management.	**Impacts:** • Moderate increase in types and quantities of wastes. No impact with proper management.	**Impacts:** • Small increase in types and quantities of wastes. No impact with proper management.	**Impacts:** • Small amounts generated by OL. No impact.
• Installation Restoration Program Sites	**Impacts:** • Possible delay in disposition of some parcels of land. • Possible land use restrictions.	**Impacts:** • Possible delay in disposition of some parcels of land. • Possible land use restrictions.	**Impacts:** • Possible delay in disposition of some parcels of land. • Possible land use restrictions.	**Impacts:** • No impact.
• Storage Tanks	**Impacts:** • No impact. All USTs not meeting regulations to be removed. Aboveground tanks to be closed in place.	**Impacts:** • No impact. All USTs not meeting regulations to be removed. Aboveground tanks to be closed in place.	**Impacts:** • No impact. All USTs not meeting regulations to be removed. Aboveground tanks to be closed in place.	**Impacts:** • No impact. Tanks removed or properly closed.

OL = Operating Location.
ROI = Region of influence.
UST = Underground storage tank.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 3 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)				
• Asbestos	**Impacts:** • Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos will require management in place.	**Impacts:** • Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos will require management in place.	**Impacts:** • Removal and disposal of asbestos in facilities to be demolished. Remaining asbestos will require management in place.	**Impacts:** • Continued management of facilities with asbestos.
• Pesticide Usage	**Impacts:** • Moderate increase in use associated with landscaping in aviation support, industrial, and commercial land uses. No impact if managed in accordance with applicable regulation.	**Impacts:** • Moderate increase in use associated with industrial, commercial, institutional and residential land uses. No impact if managed in accordance with applicable regulation.	**Impacts:** • Small increase in use associated with commercial, industrial and institutional land uses. No impact if managed in accordance with applicable regulation.	**Impacts:** • Minimal use by OL as part of caretaker activities. No impact.
• Polychlorinated Biphenyls (PCBs)	**Impacts:** • No impact. All regulated PCBs removed prior to closure.	**Impacts:** • No impact. All regulated PCBs removed prior to closure.	**Impacts:** • No impact. All regulated PCBs removed prior to closure.	**Impacts:** • No impact. All regulated PCBs removed prior to closure.
• Radon	**Impacts:** • No impact. Current levels below 4 pCi/l.	**Impacts:** • No impact. Current levels below 4 pCi/l.	**Impacts:** • No impact. Current levels below 4 pCi/l.	**Impacts:** • No impact. Current levels below 4 pCi/l.

PCB = Polychlorinated biphenyls.
pCi/l = Picocuries per liter.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 4 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Hazardous Materials and Hazardous Waste Management (Continued)				
• Medical/Biohazardous Waste	**Impacts:** • Small quantities generated by clinic. Within capacity of approved incinerator.	**Impacts:** • Small quantities generated by clinic. Within capacity of approved incinerator.	**Impacts:** • Small quantities generated by clinic. Within capacity of approved incinerator.	**Impacts:** • No impact. None generated.
• Ordnance	**Impacts:** • No impact. Ranges cleared prior to closure. Proper maintenance of public use range required.	**Impacts:** • No impact. Ranges cleared prior to closure.	**Impacts:** • No impact. Ranges cleared prior to closure.	**Impacts:** • No impact. Ranges cleared prior to closure.
Natural Environment				
• Soils and Geology	**Impacts:** • Minor erosion effects from 551 acres of ground disturbance. **Mitigations:** • Use of cover and limiting exposure time would minimize erosion effects.	**Impacts:** • Minor erosion effects from 351 acres of ground disturbance. • Possible soil contamination by runoff from burn areas. **Mitigations:** • Use of cover and limiting exposure time would minimize erosion effects. • Use of bermed pads, lined retention pond, sewers to channel runoff, and frequent leak testing and groundwater monitoring would reduce potential for soil contamination.	**Impacts:** • Minor erosion effects from 614 acres of ground disturbance. **Mitigations:** • Use of cover and limiting exposure time would minimize erosion effects.	**Impacts:** • No impact.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 5 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Natural Environment (Continued) • Water Resources	**Impacts:** • Surface water runoff from 551 acres of ground disturbance. • Beneficial effect on groundwater from closing wastewater seepage beds. **Mitigations:** • Control of runoff, minimizing exposure time and area, use of landscaping, and regular street sweeping could reduce effects of runoff on water quality.	**Impacts:** • Surface water runoff from 351 acres of ground disturbance. • Beneficial effect on groundwater from closing wastewater seepage beds. • Possible water contamination by runoff from burn areas. **Mitigations:** • Control of runoff, minimizing exposure time and area, use of landscaping, and regular street sweeping could reduce effects of runoff on water quality. • Use of bermed pads, lined retention pond, sewers to channel runoff, and frequent leak testing and groundwater monitoring could reduce potential for groundwater contamination.	**Impacts:** • Surface water runoff from 614 acres of ground disturbance. • Beneficial effect on groundwater from closing wastewater seepage beds. **Mitigations:** • Control of runoff, minimizing exposure time and area, use of landscaping, and regular street sweeping could reduce effects of runoff on water quality.	**Impacts:** • No impact.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 6 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Natural Environmental (Continued)				
• Air Quality	**Impacts:** • Regional emissions will not exceed NAAQS or PSD Class II standards.	**Impacts:** • Forest fires 1-2 times annually may exceed NAAQS and PSD Class II standards for 24-hour PM_{10} emissions. **Mitigation:** • Conduct forest fires under meteorological conditions that provide good dispersion.	**Impacts:** • Regional emissions will not exceed NAAQS or PSD Class II standards.	**Impacts:** • No impact.
• Noise	**Impacts:** • No residents exposed to DNL 65 dB or greater from aircraft operations. • Increase of 156 people exposed to DNL 65 dB or greater due to surface traffic noise. **Mitigations:** • Regional traffic planning to reduce surface traffic noise effects.	**Impacts:** • Increase of 139 people exposed to DNL 65 dB or greater due to surface traffic noise. **Mitigations:** • Regional traffic planning to reduce surface traffic noise effects.	**Impacts:** • Increase of 68 people exposed to DNL 65 dB or greater due to surface traffic noise. **Mitigations:** • Regional traffic planning to reduce surface traffic noise effects.	**Impacts:** • No increase in number of people exposed to DNL 65 dB or greater due to surface traffic noise.

dB = Decibel.
DNL = Day-night average sound level.
NAAQS = National Ambient Air Quality Standards.
PSD = Prevention of Significant Determination.
PM_{10} = Particulate matter equal to or less than 10 microns in diameter.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 7 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Natural Environment (Continued)				
• Biological Resources	**Impacts:** • No planned activities that would disturb wetland areas.	**Impacts:** • No planned activities that would disturb wetland areas. • Potential adverse effects on habitat and wildlife from fires and runoff. • Potential harmful effects to wildlife drinking from water retention pond. • Potential improvement in forest habitat from controlled burning. Mitigations: • Wetland areas separated from burn areas by vegetative buffer. • Appropriate forest management techniques in forest fire planning. • Inspect for wood turtles and, if present, move before controlled burns. • Cover water retention pond to prevent wildlife from drinking.	**Impacts:** • No planned activities that would disturb wetland areas.	**Impacts:** • Potential benefit due to reduced human activity.

Table 2.7-2. Summary of Environmental Impacts and Suggested Mitigations from the Proposed Action and Reasonable Reuse Alternatives
Page 8 of 8

Resource Category	Proposed Action	Fire Training Alternative	Recreation Alternative	No-Action Alternative
Natural Environment (Continued)				
• Cultural Resources	**Impacts:** • No effects on historic, traditional, or paleontological resources. • Potential impact to one archaeological site, potentially eligible for listing on the NRHP, located on land leased from the U.S. Forest Service. **Mitigations:** • Consultation among federal agency, SHPO, and Advisory Council in development and implementation of mitigation strategies.	**Impacts:** • No effects on historic, traditional, or paleontological resources. • Potential impact to one archaeological site, potentially eligible for listing on the NRHP, located on land leased from the U.S. Forest Service. **Mitigations:** • Consultation among federal agency, SHPO, and Advisory Council in development and implementation of mitigation strategies.	**Impacts:** • No effects on historic, traditional, or paleontological resources. • Potential impact to one archaeological site, potentially eligible for listing on the NRHP, located on land leased from the U.S. Forest Service. **Mitigations:** • Consultation among federal agency, SHPO, and Advisory Council in development and implementation of mitigation strategies.	**Impacts:** • Adequate security would preclude indirect impacts to archaeological site.

NRHP = National Register of Historic Places.
SHPO = State Historic Preservation Officer.

Table 2.7-3. Summary of Impacts from Other Land Use Concepts

Resource Category	Advanced Environmental Technology Facility
Local Community	
• Land Use and Aesthetics	No change in land use
• Transportation	No change in surface or air traffic
• Utilities	No change in utility demand
Hazardous Materials and Hazardous Waste Management	
• Hazardous Materials Management	Use of small quantities associated with a research laboratory
• Hazardous Waste Management	Small quantities generated
• Installation Restoration Program Sites	Potential acceleration of remediation activities and disposal of land parcels
• Storage Tanks	No new storage tanks
• Asbestos	Renovation of existing buildings may require removal and disposal and/or management in place
• Pesticide Usage	Small quantities to be utilized for landscaping
• Polychlorinated Biphenyls	No impact
• Radon	Below level of concern
• Medical/Biohazardous Wastes	None generated
• Ordnance	Not applicable
Natural Environment	
• Soils and Geology	No new disturbance
• Water Resources	No additional demand
• Air Quality	No new emissions
• Noise	No new sources; no increase in receptors
• Biological Resources	No impact
• Cultural Resources	No impact

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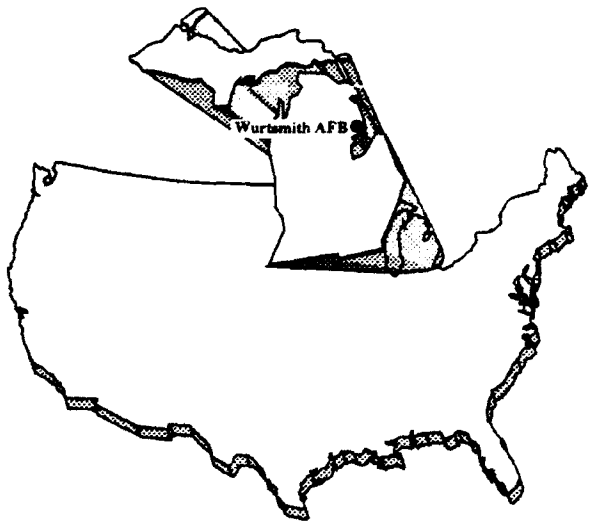


CHAPTER 3
AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

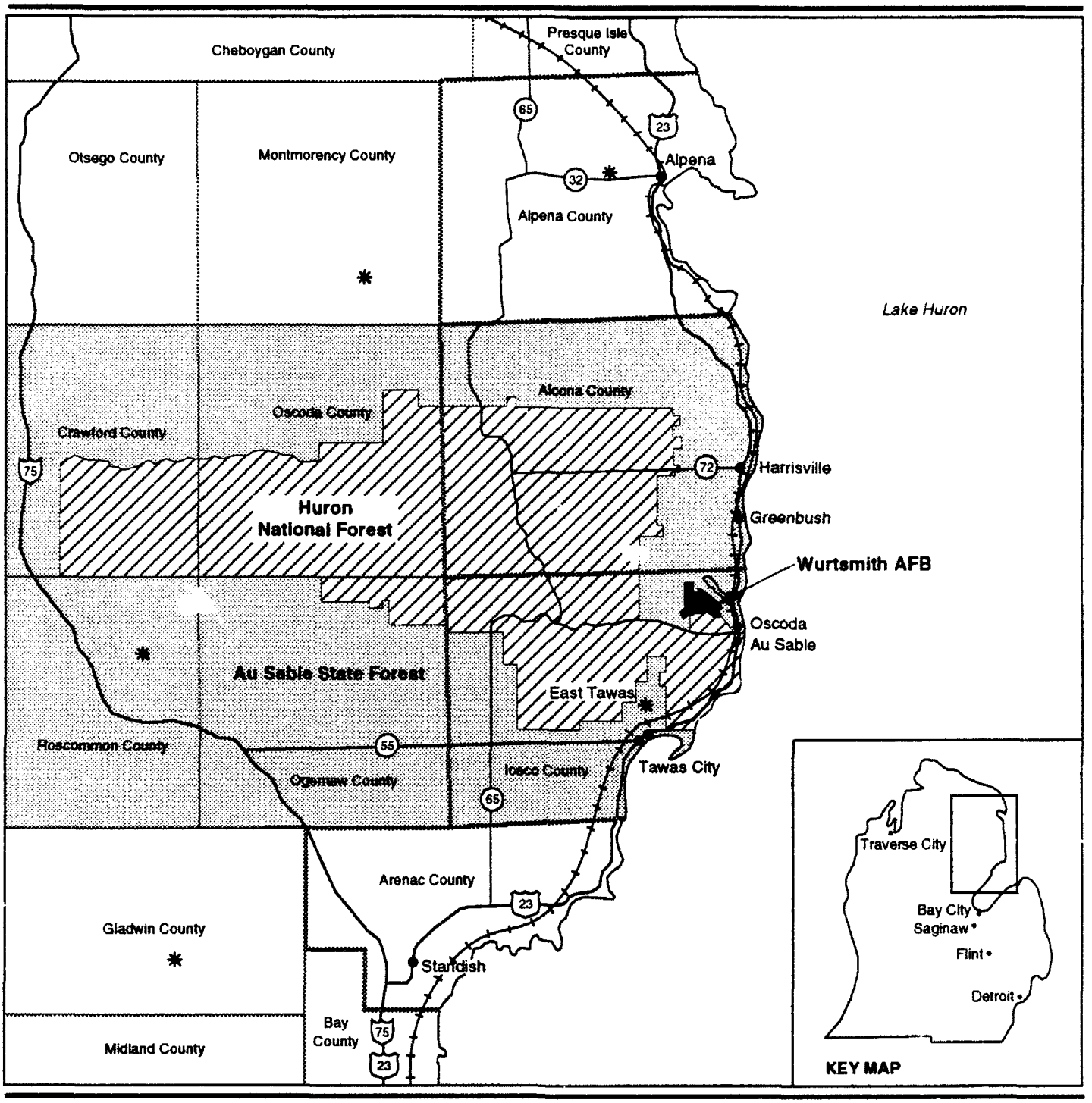
This chapter describes the environmental conditions of Wurtsmith AFB and its region of influence (ROI) at the time of base closure. It provides information to serve as a baseline from which to identify and evaluate environmental changes resulting from disposal and reuse of Wurtsmith AFB. Although this EIS focuses on the biophysical environment, some non-biophysical elements are addressed. The non-biophysical elements (influencing factors) of population and employment, land use and aesthetics, transportation networks, and public utility systems in the region and local communities are addressed. This chapter also describes the storage, use, and management of hazardous materials and waste found on base, including storage tanks, asbestos, pesticides, polychlorinated biphenyls (PCBs), radon, medical/biohazardous waste, and ordnance. The current status of the IRP is also described. Finally, the chapter describes the pertinent natural resources of soils and geology, water resources, air quality, noise, biological resources, and cultural resources.

The ROI to be studied will be defined for each resource area affected by the Proposed Action and alternatives. The ROI determines the geographical area to be addressed as the Affected Environment. Although the base boundary may constitute the ROI limit for many resources, potential impacts associated with certain issues (e.g., air quality, utility systems, and water resources) transcend these limits.

The baseline conditions assumed for the purposes of analysis are the conditions at base closure in June 1993. Impacts associated with disposal and/or reuse activities may then be addressed by comparing projected conditions under various reuses to closure conditions. A reference to preclosure conditions is provided, where appropriate (e.g., air quality) in this document, in order to provide a comparative analysis over time. Data used to describe the preclosure reference point are those that depict conditions as close as possible to the closure announcement date. This will assist the decision-maker and agencies in understanding potential long-term impacts in comparison to conditions when the installation was active.

3.2 LOCAL COMMUNITY

Wurtsmith AFB is in Iosco County in northeastern Michigan, approximately 2 miles from the western shore of Lake Huron (Figure 3.2-1). The base property encompasses 4,626 acres, which includes Air Force fee-owned land, land leased from the State of Michigan and various private entities, and land permitted for Air Force use from the U.S. Forest Service (see Figure 1.2-1). The acreages of each type of land interest are presented in



EXPLANATION

- Airports
- Interstate Highway
- U. S. Highway
- State Highway
- National Forest
- State Forest
- Railroad

0 3.5 7 14 Miles

Map Source: U.S. Department of Agriculture, Forest Service, 1986.

Regional Map

Figure 3.2-1

Table 3.2-1. An additional 595 acres of land adjacent to the base property consist of various aviation easements (577 acres) and easements for storm sewer outfalls (18 acres).

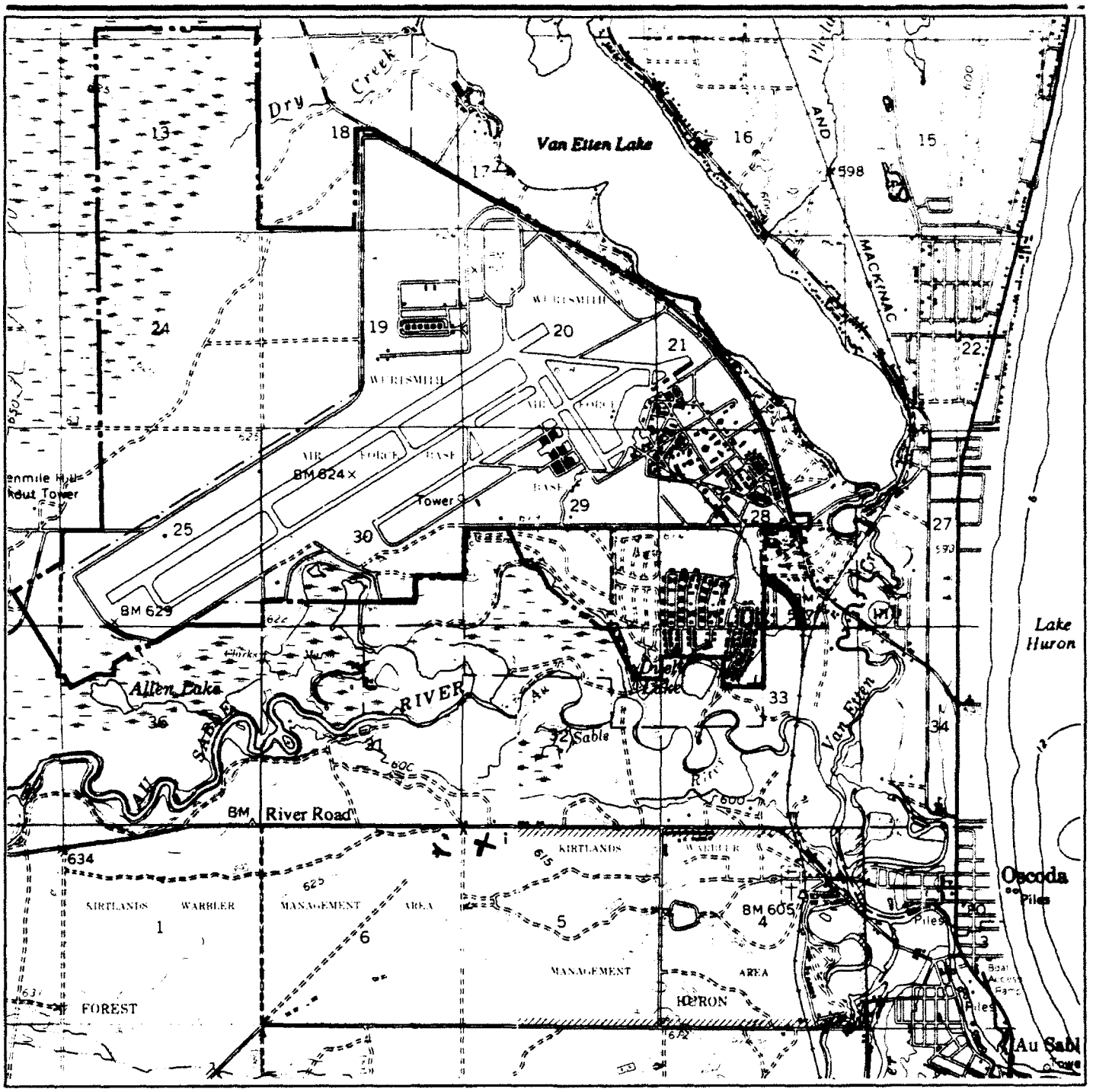
Table 3.2-1. Air Force Real Estate Interests at Wurtsmith AFB

Interest Type	Acreage	Percent of Base
Air Force fee-owned	1,943	42
Lease	2,464	53
Permit from U.S. Forest Service	219	5
Total	4,626	100

Wurtsmith AFB is on a relatively flat plain 3.5 miles wide, bounded on the west by 80-foot-high bluffs. Elevations on base range from 600 to 645 feet. The base is bordered on the southeast by Oscoda Township, on the northeast by Van Etten Lake, on the northwest and west by the Au Sable State Forest, and on the southwest and south by the Huron National Forest. The Au Sable River, which flows into Lake Huron, is approximately 0.5 mile south of the base (Figure 3.2-2). River Road, just south of the river, has been designated a National Scenic Byway. Iosco County and surrounding areas along Lake Huron are popular resort areas, offering fishing, hunting, boating, skiing, snowmobiling, camping, and other recreational opportunities.

The climate in the region is humid, characterized by harsh winters and short, mild summers. Mean monthly temperatures range from 21°F in January to 68°F in July, although temperatures as low as -22°F and as high as 102°F have been recorded. The average annual temperature is 44°F. Precipitation in the area averages about 30 inches of rainfall and 50 inches of snow annually. The heaviest snows occur from November through March. Winds generally blow from the east, over Lake Huron.

Transportation in the Wurtsmith AFB region is primarily by road. The main access route to the base is County Road F-41, which runs along the base's northeastern boundary. U.S. 23, the major north-south highway running along the shore of Lake Huron, is the primary regional access. The Detroit and Mackinac Railroad provides freight service to the base and local area; there is no passenger rail service. Iosco County Airport is approximately 15 miles south of the base, and supports private aviation uses only. The closest commercial airports are Alpena Regional Airport, approximately 45 miles north of the base, and the Tri-City International Airport near Saginaw, approximately 90 miles south.



EXPLANATION

---- Base Boundary

Wurtsmith AFB and Vicinity

0 1000 2000 4000 Feet

Map Source: U.S. Geological Survey, 1988a, 1988b.

Figure 3.2-2

Installation Background

Military use of the area now known as Wurtsmith AFB began in 1924 when the Army Air Service started using it as a gunnery range and for winter maneuvers. At that time the area was called Camp Skeel. Beginning in 1942 and continuing through World War II, the base, renamed Oscoda Army Air Field, was used as a support base for aircrew training. The base was closed in 1945, then reactivated in 1947 under the Continental Air Command and used for transient activities. With the creation of the Department of the Air Force, the base was renamed Oscoda AFB in 1948, and hosted units from the Air Defense Command. In 1953, the base was renamed Wurtsmith AFB, after Major General Paul B. Wurtsmith of Michigan, the only flying general to win the Distinguished Service Medal in combat, during World War II.

A major expansion of the base was begun in 1958, to support the Air Force's Strategic Air Command (SAC). Over the next 3 years, SAC moved the 4026th Strategic Wing, the 920th Air Refueling Squadron (AREFS), and the 379th Bombardment Wing (BMW) to the base. The 379th BMW became the host unit at Wurtsmith AFB in 1961, assimilating personnel and equipment from the 4026th, which was inactivated. The 379th BMW and the 920th AREFS were involved in air combat operations during the conflict in Vietnam and in Operation Desert Storm in 1991. Major tenant units include the 2030th Communications Squadron; Detachment 28, 26th Weather Squadron; Detachment 14, 3904th Management Engineering Squadron; Detachment 224, 3753rd Field Training Squadron; and the 71st Flying Training Wing. In 1992, responsibility for the base was transferred to the newly established ACC. The base was closed on June 30, 1993.

3.2.1 Community Setting

The area surrounding Wurtsmith AFB is a popular Michigan resort and vacation area with mostly small, unincorporated communities dispersed throughout county townships. The ROI for communities potentially affected by base disposal and reuse comprises the four counties of Alpena, Alcona, Iosco, and Arenac.

The base is within Oscoda Township in the northeast part of Iosco County (Figure 3.2-3). The greatest effects of reuse of the base are expected to occur in Oscoda and Au Sable townships in Iosco County and Greenbush Township in Alcona County, where most of the base-related population reside. Lesser effects are also expected in East Tawas, located in Baldwin Township, and in Tawas City, in Tawas Township.

Employment in the ROI was 38,272 in 1990 and is projected to be 33,495 in 1993, at base closure. Overall employment growth in the region averaged 1.8 percent annually between 1970 and 1990, slightly lower than

EXPLANATION

- Base Boundary
- Oscoda Township
- City Areas
- Iosco County Boundary

0 1.25 2.5 5 Miles

Local Government Boundaries in Iosco County

Figure 3.2-3

the national average. The major employment sectors in the ROI are government, services, retail trade, and manufacturing. In 1990, the government sector provided 25.9 percent of the jobs in the ROI. Wurtsmith AFB employed 3,969 personnel (3,062 military, 907 civilian) in 1990 (U.S. Air Force, 1990b). By closure, employment at Wurtsmith AFB will decrease to 50 direct and 11 indirect jobs associated with the OL.

Population in the four-county region was about 85,890 in 1990, and is projected to be 78,139 at closure in 1993. Population growth in the ROI averaged 0.1 percent annually between 1980 and 1990. This growth rate is expected to continue after base closure, primarily as a result of in-migration associated with recreational resources, retirees, and tourism.

The populations of Oscoda, Au Sable, and Greenbush townships all increased from 1980 to 1990. The population centers of these townships are the unincorporated communities of Oscoda, Au Sable, and Greenbush. These communities are generally located in the eastern portions of the three townships, along U.S. 23 and the shore of Lake Huron. Oscoda and Au Sable, at the mouth of the Au Sable River, together form the largest developed area in the three townships, providing the main support community adjacent to Wurtsmith AFB.

Although the township populations increased, the population of the unincorporated communities of Oscoda and Au Sable decreased an average of 4.6 percent annually from 1980. The 1990 population of 2,603 in these two communities represented 27 percent of the off-base population in Oscoda and Au Sable townships. The population in these communities can double or even triple during the peak tourist months of July and August.

3.2.2 Land Use and Aesthetics

This section describes the existing land uses and aesthetics for the base property and the surrounding areas of Wurtsmith AFB at base closure. Land uses at closure are assumed to be similar to existing land uses in the vicinity of the base unless specific development plans project a change. The ROI includes the base property and potentially affected adjacent properties that are within the jurisdiction of Oscoda Township in Iosco County.

3.2.2.1 Land Use

Land Use Plans and Regulations. The general plan for a jurisdiction represents the official position on long-range development and resource management. The position is expressed in goals, policies, plans, and actions regarding the physical, social, and economic environments, both now and in the long term.

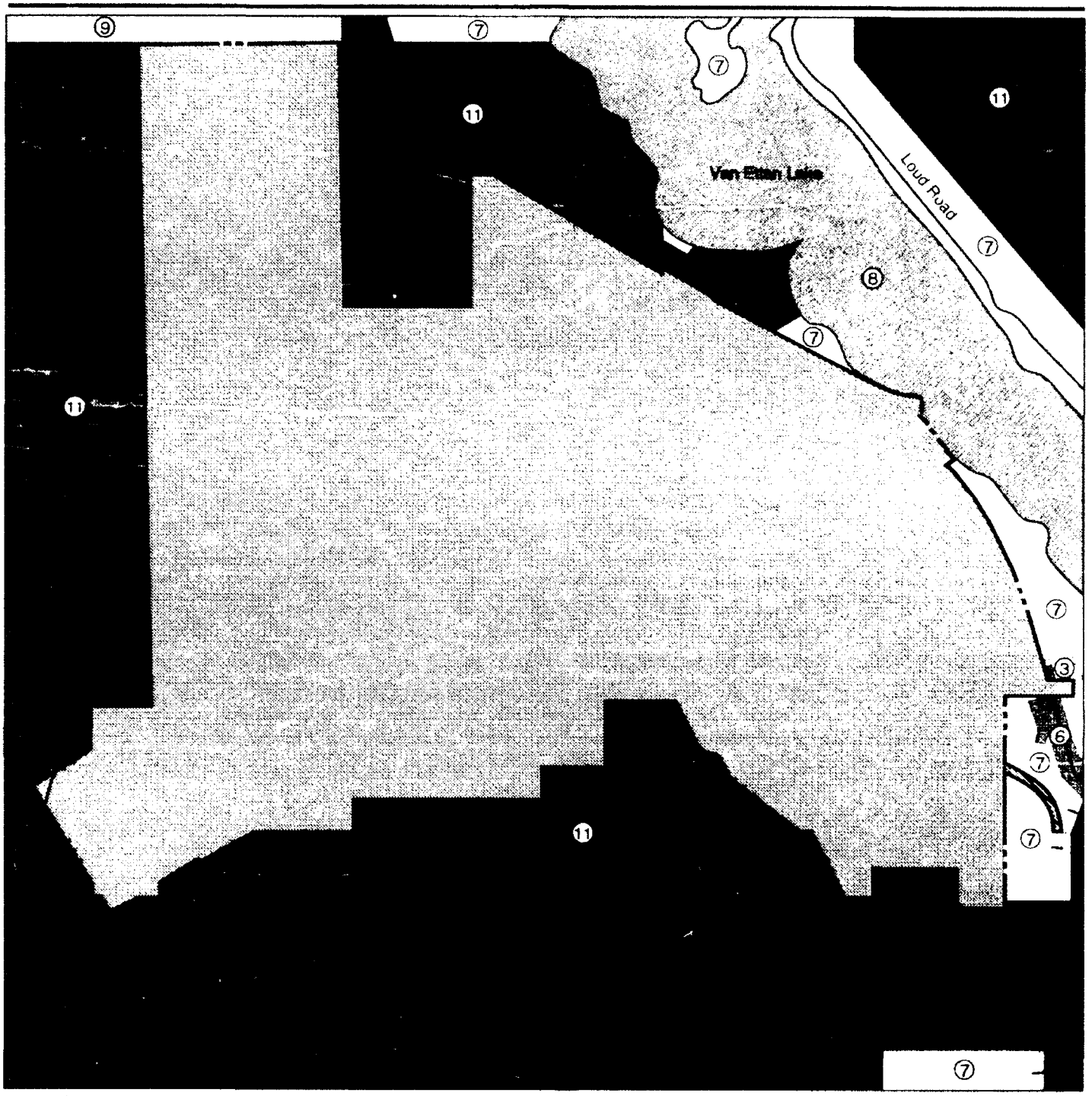
Iosco County has specific goals and objectives with respect to economic development, housing, county services, and land use. Oscoda Township, chartered by the state to develop and implement land use policies within its boundaries, is guided by a General Development Plan (GDP), last revised in October 1987 (Ronald F. Nino and Associates, 1987). The township does not include major changes in its land use plan for the area adjacent to the base. The only area of concern is in the southeast quadrant, immediately outside the base near the Main Gate. The township plans to promote industrial development in this commercial and residential area, which abuts the base family housing area.

The State of Michigan has adopted two acts administered by the Department of National Resources to regulate development adjacent to streams and lakes. The Inland Lakes and Streams Act (Public Act 346, 1972) requires a permit for any dredging, filling, or construction of a permanent structure below the ordinary high water mark of a lake or stream or for dredging within 500 feet of a lake or stream. The shoreline of Van Etten Lake would be covered by this Act. The Shorelands Protection and Management Act (Public Act 245, 1990) manages the coastal land uses for a zone approximately 1,500 feet wide adjacent to Lake Huron, in the vicinity of Wurtsmith AFB. Since Wurtsmith AFB property is approximately 1 mile from the shoreline of Lake Huron, it is not subject to this Act.

Zoning. Basically, zoning provides for the division of the jurisdiction, in conformity with the GDP, into districts within which the height, open space, building coverage, density, and type of future land uses are set forth. Zoning is designated to achieve various community development goals, including base reuse plans.

Oscoda's zoning regulations have established most of the area around the base as forestry to promote the development of small forestry operations and wildlife management in wooded areas (Oscoda, 1984). Other zoning designations adjacent to the base include mixed residential, industrial, agriculture, and commercial (i.e., general business). Wurtsmith AFB, as federal property, is not zoned. The Oscoda Township zoning designations for the area are presented in Figure 3.2-4.

On-Base Land Use. Land use identifies the present land usage by various general categories. Existing (preclosure) land uses on the base property are described in this section.



EXPLANATION

- ① Airfield*
- ② Aviation Support*
- ③ Industrial
- ④ Institutional (Medical)*
- ⑤ Institutional (Education)*
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public Facilities/ Recreation
- ⑨ Agriculture
- ⑩ Vacant Land *
- ⑪ Forestry
- Not Zoned
- Base Boundary

0 750 1500 3000 Feet

* Not Applicable

Note: Figure 1 2-1 shows Air Force fee-owned property

Local Zoning

Figure 3.2-4

The base property includes the following land uses:

Land Use	Airfield
Airfield	1,372
Aviation support	106
Industrial	653
Institutional	27
Commercial	82
Residential	386
Public facilities/recreation	2,000
Total	4,626

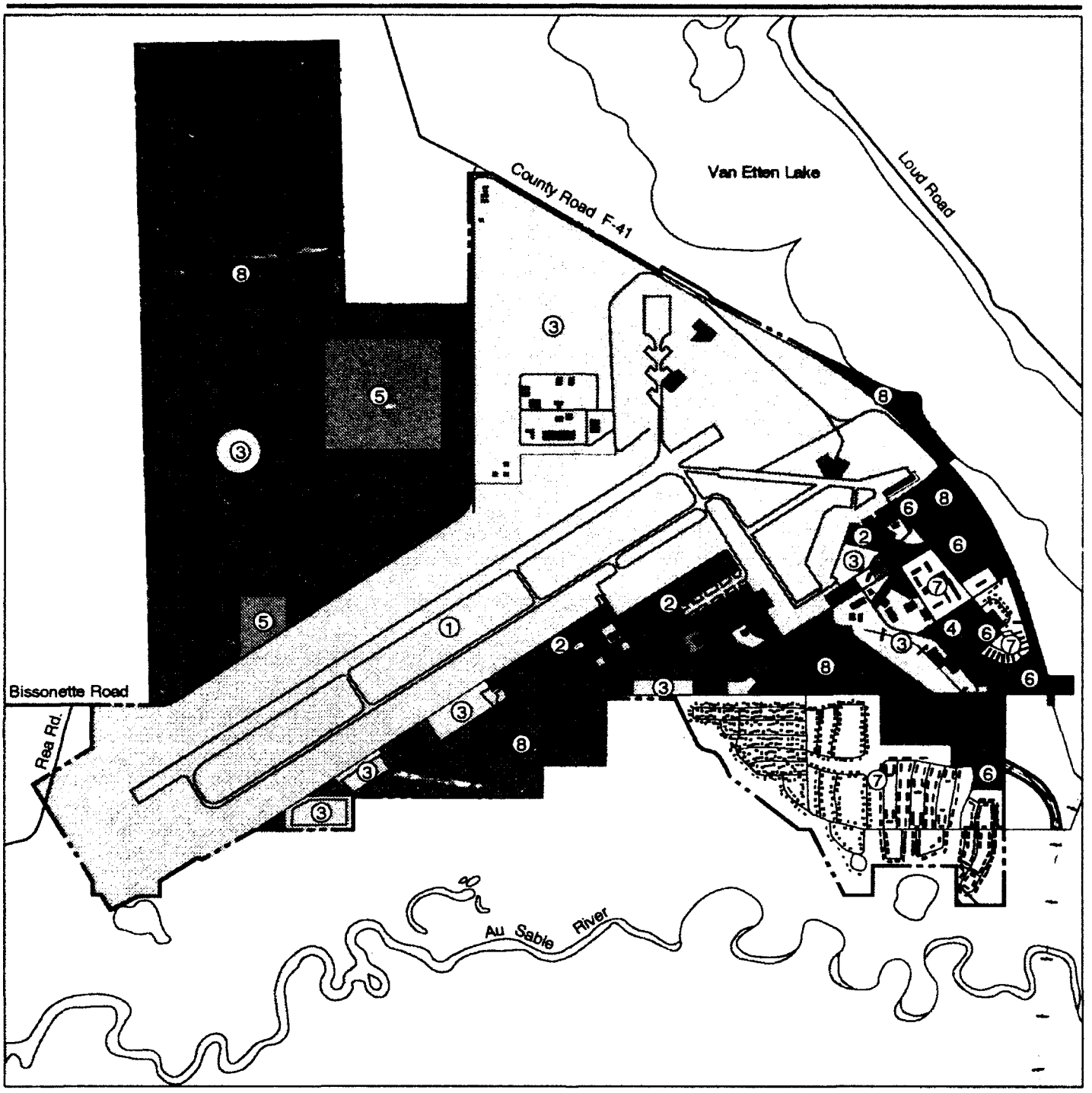
The existing land uses for Wurtsmith AFB are shown in Figure 3.2-5. The following text briefly describes on-base land use categories.

The **airfield** land use area is the principal feature on base, with facilities capable of supporting a variety of airfield operations. The runway and Clear Zones (CZs) divide the relatively undeveloped northwest half of the base from the cantonment in the southeast. The airfield includes Runway 06/24, supporting taxiways and operational aprons, and safety areas. Other features include the alert apron (north of the northeast end of the runway), an ATC tower, three aircraft rescue and fire fighting facilities, and navigational aids. Airfield facilities and equipment are generally well maintained and in good condition. An extensive hydrant refueling system is installed in the operational apron, south of the northeast end of the runway, near the hangars.

The **aviation support** areas contain facilities for aircraft operation and maintenance. Aviation support is concentrated in areas south of the operational apron in the south-central portion of the base. Facilities include hangars, aircraft maintenance shops, and administrative offices. Other aviation support facilities are scattered around the east end of the airfield.

The **industrial** areas include the heating plant; civil engineering shops; base supply; vehicle maintenance; and transportation, fuel, and utility plants. The EOD range in the forested northwest quadrant of the base is also considered an industrial use area.

The **institutional** land use category includes both medical and educational uses. The **medical** area includes the base hospital and clinic, which provide emergency and daily medical needs for military personnel and their dependents. This site is in the center of the cantonment, near the residential areas. The **education** areas include the education center in the northwest portion of the cantonment area, and various training facilities. Classrooms in the Field Detachment Training facility and the squadron operations area, as well as the small arms and grenade launching ranges in



EXPLANATION

- ① Airfield
- ② Aviation Support
- ③ Industrial
- ④ Institutional (Medical)
- ⑤ Institutional (Education)
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public Facilities/ Recreation
- ⑨ Agriculture *
- ⑩ Vacant Land *
- Base Boundary

0 750 1500 3000 Feet

* Not Applicable

Note: Figure 1.2-1 shows Air Force fee-owned property.

Source: Adapted from Ayres Associates, 1990.

Existing On-Base Land Use

Figure 3.2-5

the northwest quadrant of the base (north of the runway), are included in this land use.

The commercial areas include the administrative offices of the base, the community center, exchange shops, and commissary, and are located in the southeast quadrant.

The residential areas include 1,342 single-family, duplex, and multi-family units and 647 double-occupancy dormitory rooms and suites. There are also 42 single- and double-occupancy units for visiting officers and airmen. The family housing areas are in the southeast quadrant of the base; the dormitories and visitors' quarters are near the Main Gate in the cantonment.

The public facilities/recreation areas offer both outdoor and indoor recreation facilities, such as football/soccer and baseball fields, bowling lanes, and the library. Other recreation areas include cross-country jogging/skiing trails north of the military family housing and the physical readiness training course, at the south-central base boundary. Air Force Beach is a recreation area on the shoreline of Van Etten Lake along County Road F-41; it offers facilities for swimming, boating, and picnicking.

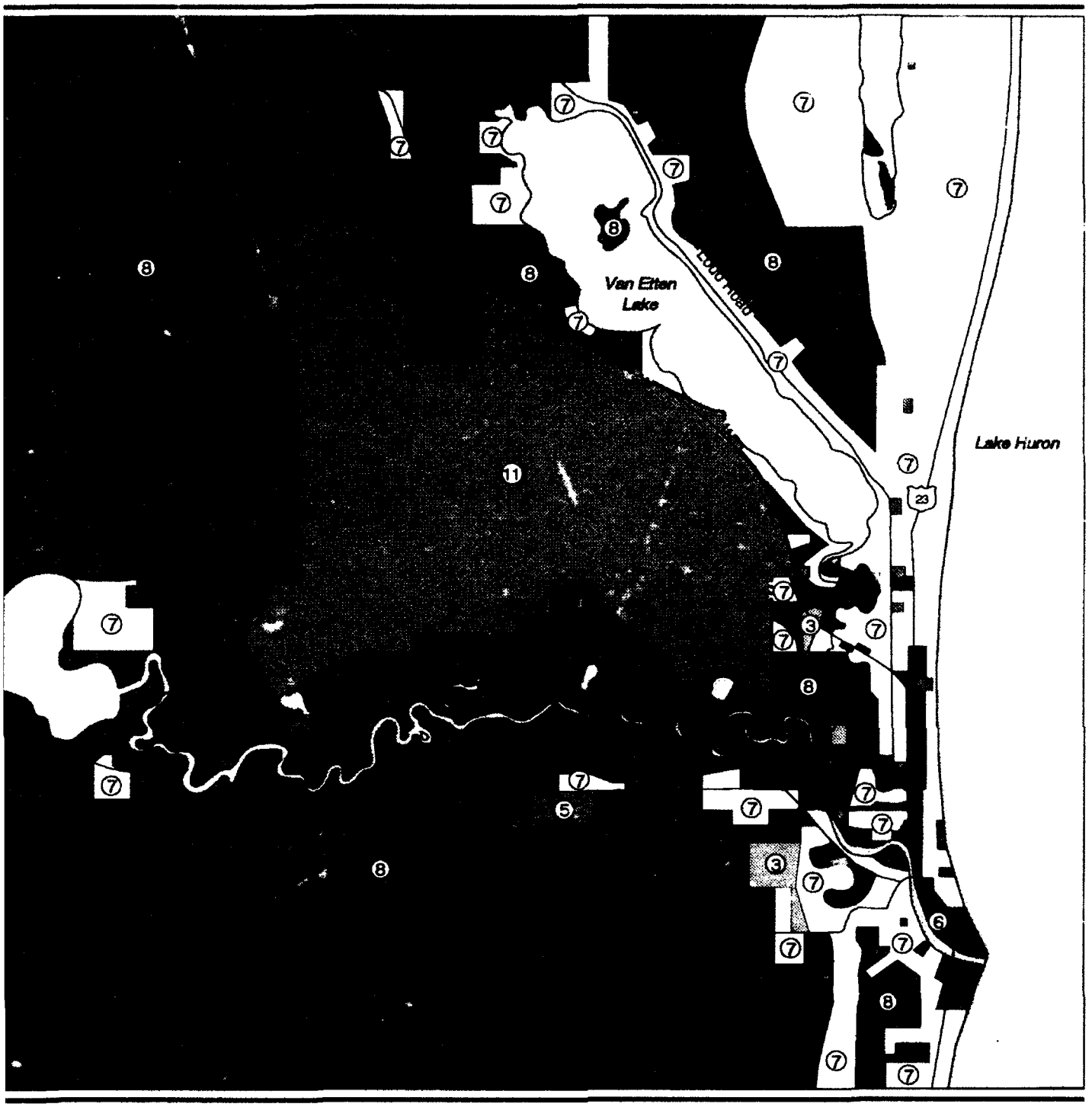
Adjacent Land Use. Typical of most unplanned development, land use may or may not conform with zoning. The existing land uses in the immediate vicinity of the base are discussed in this section.

Most of the area around the base is devoted to public facilities/recreation uses. The Au Sable State Forest is adjacent to the base on the north and west. South of the base is the Huron National Forest, which includes the floodplain along the Au Sable River. Hunting and camping are popular in the forest and wooded areas, and the Au Sable River provides excellent fishing.

Aviation easements at the southeast end of the runway comprise 577 acres. Four additional easements in separate locations east and southeast of the base, totaling 18 acres, are used for storm sewer outfalls into Van Etten Creek and the Au Sable River.

Urban development is primarily confined to areas southeast of the base (Figure 3.2-6). East of the base, along the shore of Van Etten Lake, low-density residential and public facilities/recreation land uses predominate. Regional residential density is approximately one dwelling unit per acre or less. Similar residential development occurs farther north, beyond the state forest boundary, and on the northeast side of Van Etten Lake, where a planned residential and recreational development is located.

East of the base, residential density increases and commercial development is present along County Road F-41. Relatively dense multi-family and mobile home housing is also located in this area. An abandoned golf course abuts



EXPLANATION

- 1 Airfield*
- 2 Aviation Support*
- 3 Industrial
- 4 Institutional (Medical)*
- 5 Institutional (Education)
- 6 Commercial
- 7 Residential
- 8 Public Facilities/ Recreation
- 9 Agriculture *
- 10 Vacant Land *
- 11 Base Property
- Base Boundary

0 1375 2750 5500 Feet

* Not Applicable

Note: Figure 1.2-1 shows Air Force fee-owned property.

Existing Off-Base Land Use

Figure 3.2-6

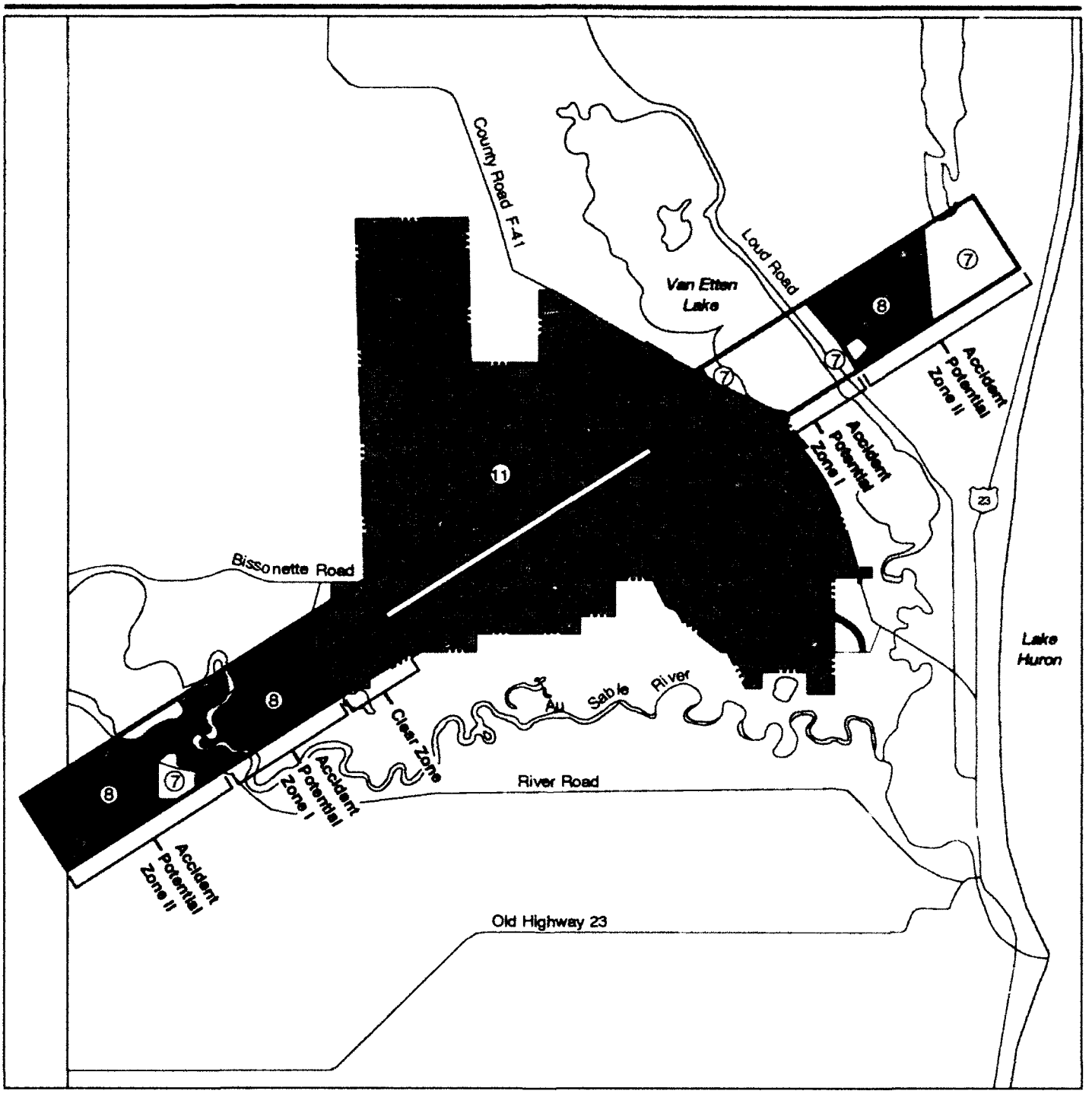
the military family housing area on the east side of the base, straddling the base rail spur. These uses are generally compatible with adjacent on-base uses.

Air Force Policies Affecting Adjacent Land Uses. The Air Force has developed the Air Installation Compatible Use Zone (AICUZ) program to minimize development that is incompatible with aviation operations in areas on and adjacent to military airfields. The AICUZ land use recommendations are based on (1) land uses compatible with exposure to aircraft noise and (2) safety considerations. Recommended compatible land uses are derived from data on noise contours (noise zones) and safety zones (Accident Potential Zones [APZs]). These zones are delineated specifically for each base, using operational information derived from the base mission. Municipalities with jurisdiction over adjacent lands may zone this land in accordance with AICUZ recommendations, but they are not required to do so.

AICUZ noise contours are based on standard noise ratings that are calculated from types of aircraft, number of daily aircraft operations, time of day flown, aircraft flight patterns, power settings, air speeds, altitudes, and climatic conditions (U.S. Air Force, 1978a). A day-night weighted average sound level (DNL) is used to describe the noise environment. Noise contours for preclosure conditions at Wurtsmith AFB are presented and discussed in Section 3.4.4, Noise. In 1990, a total of 37,500 acres were exposed to DNL of 65 decibels (dB) or more from aircraft operations. These areas contain residential, public facilities/recreation, and commercial land uses.

The AICUZ delineates areas at both ends of the runway where the probability of aircraft accidents is highest, based on the locations of past aircraft accidents at various bases. The risk of accidents is so high in the areas at either end of the runway (known as the CZ) that the Air Force has a program to acquire easements to preclude most land uses. Certain land use restrictions are recommended in lower risk areas, identified as APZ I and APZ II.

At Wurtsmith AFB, only the airfield land use exists within the CZ. Industrial, agricultural, recreation, and vacant land uses are compatible with APZ I, but residential and other high population density land uses are discouraged. Even so, low-density residential and public facilities/recreation uses, including Van Etten Lake, are present within APZ I. Low-density (maximum of 20 percent building coverage) residential and nonresidential uses are compatible with APZ II, in addition to those uses listed for APZ I (Figure 3.2-7). At Wurtsmith AFB, there is a low-density residential area containing about 40 units within APZ II northeast of the base, and Foote Site Village, a residential area containing about 70 units, is within APZ II southwest of the base.



EXPLANATION

① Airfield*	⑤ Institutional (Education)*	⑨ Agriculture *
② Aviation Support*	⑥ Commercial*	⑩ Vacant Land *
③ Industrial *	⑦ Residential	⑪ Base Property
④ Institutional (Medical)*	⑧ Public Facilities/ Recreation	Base Boundary

0 1375 2750 5500 Feet

* Not Applicable

Note: Figure 1.2-1 shows Air Force fee-owned property.

Clear Zones and Accident Potential Zones

Figure 3.2-7

The Oscoda Township GDP of 1987 established a policy restricting the runway approach zone to the lowest possible densities. The comprehensive land use plan indicates that the general area should contain low-density residential, agricultural, and industrial uses.

Closure Baseline. Under closure baseline conditions, Wurtsmith AFB would be closed and all military activities on base property would be terminated, except those associated with the OL. All land use conflicts and constraints associated with the AICUZ would be eliminated.

3.2.2.2 Aesthetics. Visual resources include natural and man-made features that give a particular environment its aesthetic qualities. One of the criteria used in the analysis of these resources is visual sensitivity, which indicates the degree of public interest in a visual resource and concern over adverse changes in its quality. Visual sensitivity is categorized in terms of high, medium, or low levels.

High visual sensitivity exists in areas where views are rare, unique, or in other ways special, such as in remote or pristine environments. High-sensitivity views would include landscapes that have landforms, vegetative patterns, water bodies, or rock formations of unusual or outstanding quality.

Medium visual sensitivity areas are more developed than those of high sensitivity. Human influence is more apparent in these areas and the presence of motorized vehicles and other evidence of modern civilization is commonplace. These landscapes generally have features containing varieties in form, line, color, and texture, but tend to be more common than high visual sensitivity areas.

Low visual sensitivity areas tend to have minimal landscape features, with little change in form, line, color, and texture.

The natural features of the area constitute an aesthetic resource that is important to the public, in terms of use and enjoyment, although these features are generally of a common regional type, visually. By contrast, the local man-made features do not constitute a visual resource of a quality above medium sensitivity and, in many cases, they detract from the aesthetic qualities of the perceived environment.

The area around Wurtsmith AFB is typical of the Central Lowlands Physiographic Province, with flat, straight lines and smooth to medium textures. The base is flat with a bluff rising to the west. Most of the area is coniferous and deciduous forest, green and well vegetated in the spring and summer but bare and brown in winter.

According to the definitions of visual sensitivity above, no areas of high visual sensitivity exist in the vicinity. Many areas are considered to be of

medium visual sensitivity (Figure 3.2-8), including Van Etten Lake and shoreline, the Au Sable River corridor south of the base, and the forested areas in the northwest quadrant and along much of the base boundary. Because there is strong public interest in the quality of the forested environment and the associated recreational opportunities in the area, some of the forested areas along the base boundary are also considered of medium visual sensitivity. Low sensitivity areas occur primarily in urbanized areas on and southeast of the base.

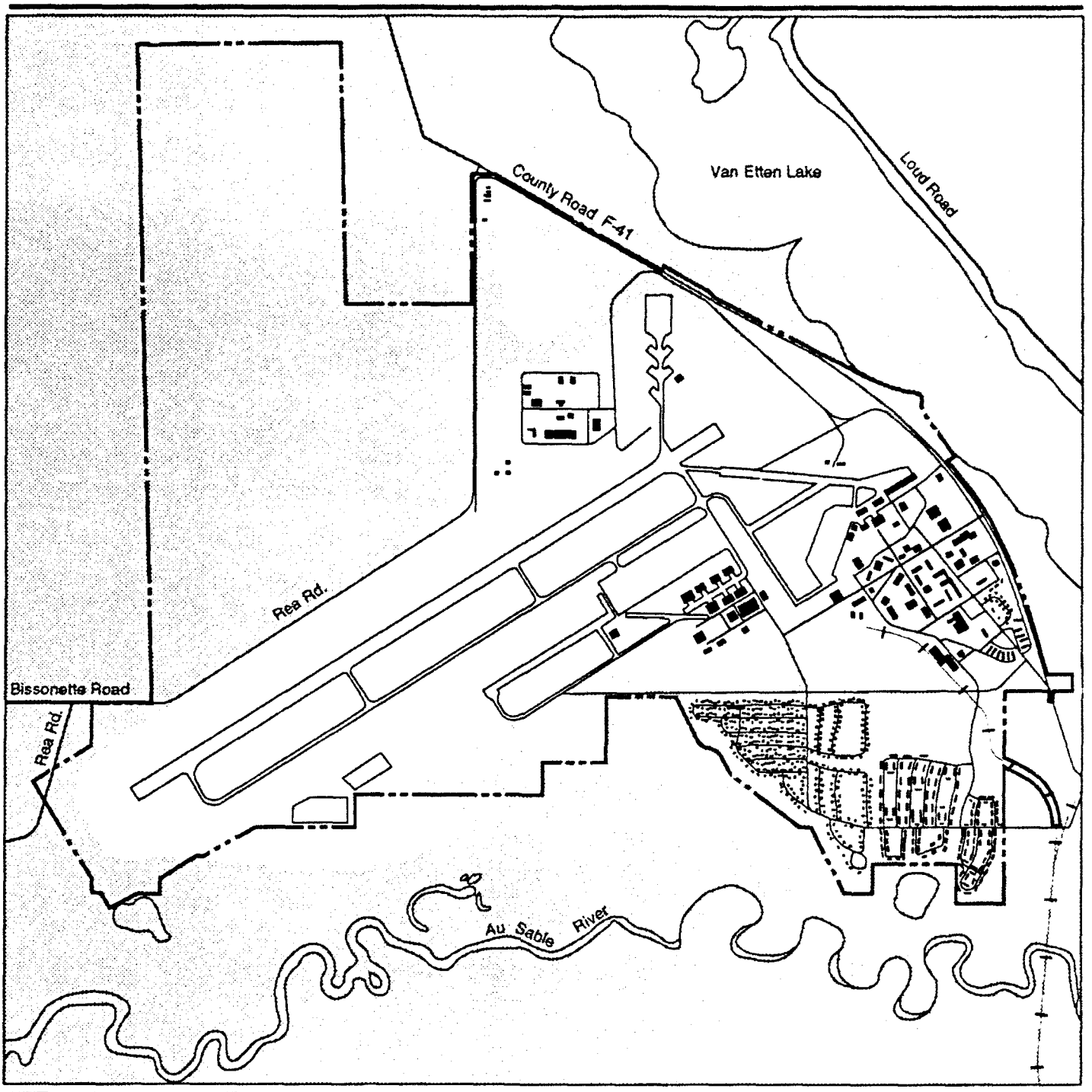
Architectural styles on base are eclectic and of a few fundamental types. The styles reflect the time period in which they were built, generally post-1950 to 1990. Most of the buildings in the cantonment have brick facades and are one to four stories in height. The industrial structures have exterior surfaces of painted metal siding, concrete masonry, or massive concrete.

High-bay, single-story structures, with a consistent color scheme, dominate the flightline. Cantonment facilities are generally sited with ample setbacks and parking facilities. Rooflines are typically flat or low gables. In some areas, facilities can be seen from off base and vice versa. Generally, the quality and complementary character of on-base architecture and development improvements exceed that of the surrounding region.

3.2.3 Transportation

Transportation addresses roadways, airspace and air transportation, and other modes of transportation. The ROI for the transportation analysis includes the existing principal road, air, and rail networks that serve as direct or key indirect linkages to the base, with emphasis on the immediate area on and surrounding Wurtsmith AFB.

3.2.3.1 Roadways. The evaluation of the existing roadway conditions focuses on capacity, which reflects the ability of the network to serve the traffic demand and volume. The capacity of a roadway segment depends mainly on the street width, number of lanes, intersection control, and other physical and environmental factors. Traffic volumes typically are reported, depending on the project and data base available, as the daily number of vehicles in both directions on a segment of roadway averaged over a full calendar year to give average annual daily traffic (AADT) or simply averaged over a certain time period less than 365 consecutive days to give the average daily traffic (ADT) volume, and/or the number of vehicles on a road segment during the average peak hour. For this analysis, a peak-hour volume of 10 percent of the ADT is used, based on research findings (Transportation Research Board, 1985) and supported by station counts on U.S. 23 for the previous 10 years (these counts show a predominant afternoon peak representing 7 to 10 percent of ADT). These figures are useful indicators in determining the extent to which the roadway segment is used and in assessing the potential for congestion and other problems.



EXPLANATION

- Base Boundary
- Low Visual Sensitivity
- Medium Visual Sensitivity

0 750 1500 3000 Feet

Visual Sensitivity

Figure 3.2-8

The performance of a roadway segment is generally expressed in terms of level of service (LOS). The LOS scale ranges from A to F with each level defined by a range of volume-to-capacity ratios. LOS A, B, and C are considered good operating conditions in which minor or tolerable delays are experienced by motorists. LOS D and E represent below average conditions. LOS F represents a traffic jam. Table 3.2-2 presents the LOS designations and their associated volume-to-capacity ratios. These levels are based primarily on the Highway Capacity Manual (Transportation Research Board, 1985), and are adjusted for local conditions.

Table 3.2-2. Levels of Service (LOS) for Basic Roadway Sections

		Criteria (Volume/Capacity)		
LOS	Description	Freeway[a]	4-Lane[b] Arterial	2-Lane[c] Highway
A	Free flow with users unaffected by presence of other users of roadway	0-0.35	0-0.28	0-0.10
B	Stable flow, but presence of other users in traffic stream becomes noticeable	0.36-0.54	0.29-0.45	0.11-0.23
C	Stable flow, but operation of single users becomes affected by interactions with others in traffic stream	0.55-0.77	0.46-0.60	0.24-0.39
D	High density, but stable flow; speed and freedom of movement are severely restricted; poor level of comfort and convenience	0.78-0.93	0.61-0.76	0.40-0.57
E	Unstable flow; operating conditions near capacity with reduced speeds, maneuvering difficulty, and extremely poor levels of comfort and convenience	0.94-1.00	0.77-1.00	0.58-0.94
F	Forced or breakdown flow with traffic demand exceeding capacity; unstable stop-and-go traffic	1.00	1.00	0.94-1.00

Notes:
(a) Table 3-1, Levels of Service for Basic Freeway Section, Highway Capacity Manual, Transportation Research Board, 1985.
(b) Table 7-1, Levels of Service Criteria for Multilane Highways, 4-lane arterial, 50 mph Design Speed, Highway Capacity Manual, Transportation Research Board, 1985.
(c) Table 8-1, Level of Service Criteria for General two lane Highway Segments, Rolling Terrain, 20 percent no passing zones, Highway Capacity Manual, Transportation Research Board, 1985.

A major traffic characteristic of the ROI is its seasonal variation. The Michigan Department of Transportation (MDOT) has prepared a seasonal trend analysis for various locations in the state. This analysis identifies the ROI as a recreational region with high summer peak traffic and high

variability in monthly traffic. Figure 3.2-9 displays the monthly trends applicable to the ROI and used in the LOS analysis. This figure shows that traffic volumes peak in July and August and decline in the winter. Peak summer traffic volumes are particularly high on weekends and involve a high percentage of recreational vehicles. The LOS analysis for this EIS is conducted for July, the peak month of the year.

Regional access to Wurtsmith AFB is provided by U.S. 23, a principal north-south roadway to Iosco, Arenac, and Alcona counties. U.S. 23 provides a major link between the industrial area around Bay City and the northern peninsula via Standish, Tawas, Oscoda, and Alpena. Outside Oscoda and Au Sable, this is a two-lane rural highway with lanes 12 feet wide and usable shoulders of 6 feet or wider. The terrain is generally level. Within a portion of the urbanized areas of south Oscoda and Au Sable, the two lanes become four through lanes with traffic control at intersections. Regional accesses to Wurtsmith AFB are provided by Michigan Route 55, a major east-west roadway connecting U.S. 23 at Tawas City with Interstate 75; Michigan Route 65, a north-south roadway parallel to U.S. 23, located about 20 miles to the west (see Figure 3.2-1); and the primary roads, River Road and Rea Road, in Oscoda Township (Figure 3.2-10).

Figure 3.2-10 shows the general local road network now in place and projected to be in place at the time of closure in the Wurtsmith AFB vicinity. For the purposes of this analysis, the following roads have been identified as the most important in providing access to the base area:

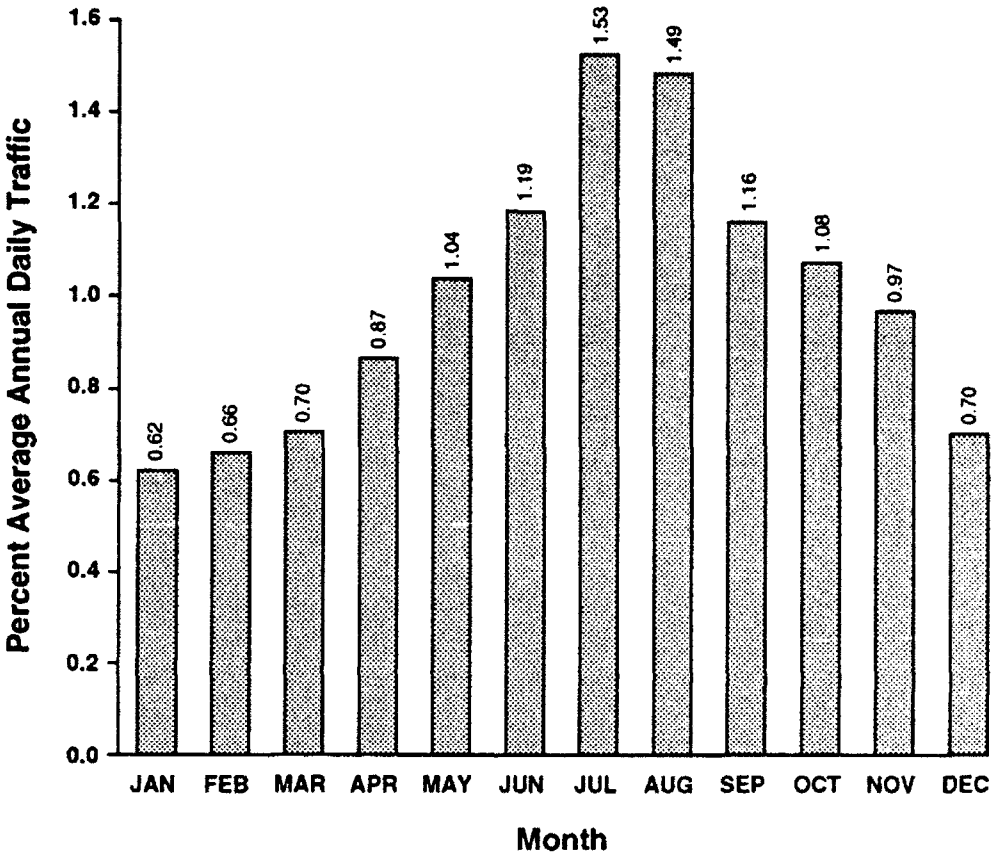
- County Road F-41 between U.S. 23 and the Main Gate to Wurtsmith AFB provides the main access to the base. It is a four-lane roadway with three signalized intersections (at U.S. 23, Cedar Lake Road, and Skeel Avenue) and one at-grade rail crossing. North of the Main Gate, F-41 is a two-lane roadway.

- Cedar Lake Road is a two-lane roadway connecting County Road F-41 to a residential area in north Oscoda.

- Loud Road is a two-lane residential roadway from Cedar Lake Road that provides access to the eastern shore of Van Etten Lake.

- River Road between U.S. 23 and Grass Lake Road is a two-lane, east-west urban street in the southern part of Oscoda. Farther west, River Road is a two-lane rural roadway.

- Rea Road is a two-lane rural roadway connecting F-41 to River Road on the west side of the base.



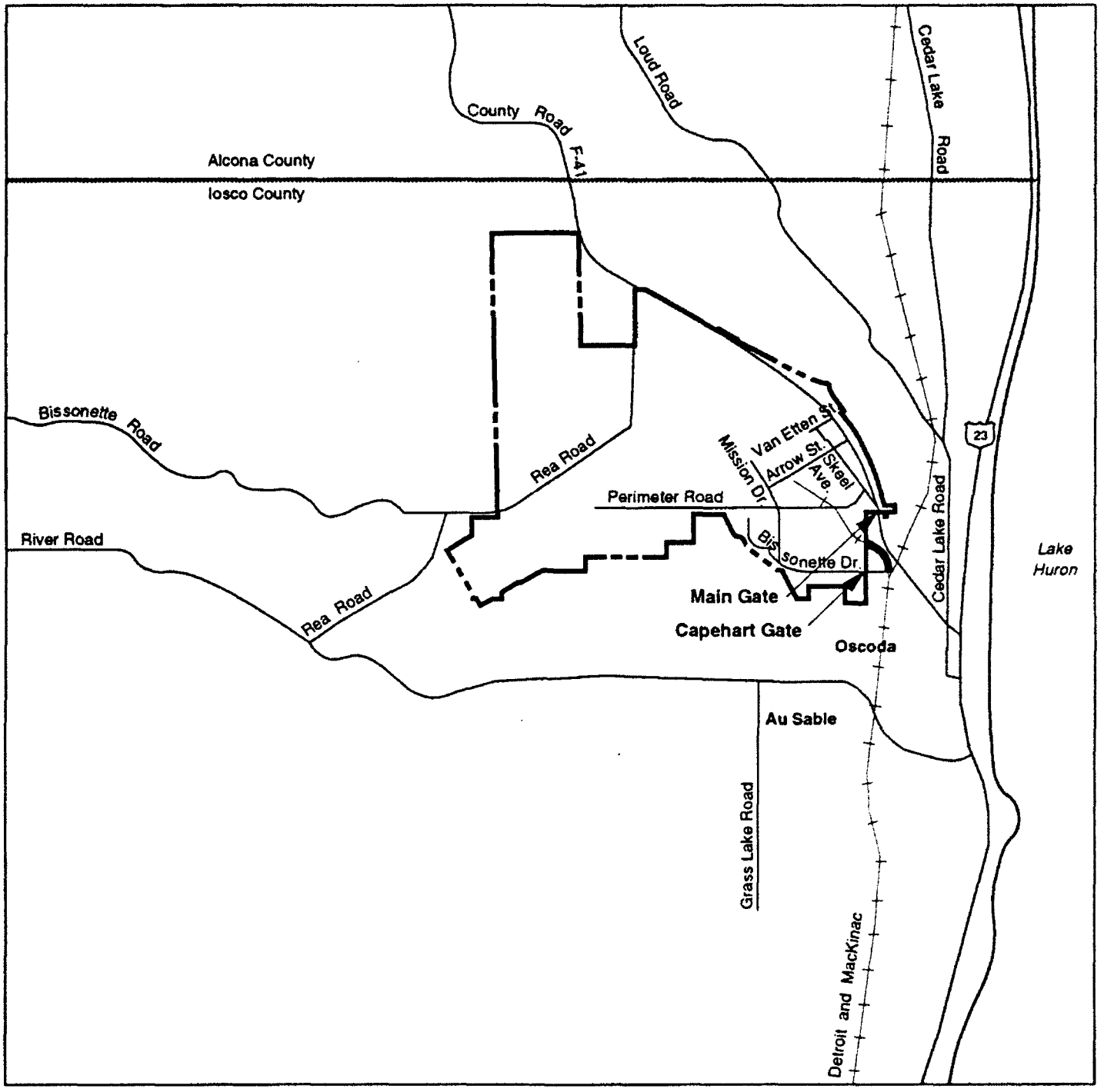
EXPLANATION

Average Daily Traffic as a Percent of Average Annual Daily Traffic

Monthly Traffic Trends in ROI

Figure 3.2-9

Source: Adapted from Michigan Department of Transportation, 1991.



EXPLANATION

- Base Boundary
- Railroad
- U. S. Highway

0 1750 3500 7000 Feet

Local Transportation System

Figure 3.2-10

- Bissonette Road is a two-lane rural roadway connecting Rea Road to western Iosco County.

Wurtsmith AFB is currently accessible through two gates (see Figure 3.2-10). The Main Gate at Skeel Avenue is used by civilian and military personnel, visitors, and contractors, and for industrial and commercial deliveries. All incoming vehicles associated with base activity, other than housing, travel on Skeel Avenue from the Main Gate, with most traffic dividing at the Arrow Street intersection. The Capehart Gate, on Bissonette Drive, is the primary access to on-base family housing.

On-base roads are primarily two-way, two-lane, paved roads, with no street parking and a speed limit of 25 miles per hour (mph). In the family housing areas, street parking is permitted and the speed limit is 15 mph. Traffic control is achieved by yield and stop signs with priority given to major streets. The on-base roads with the heaviest traffic are Skeel Avenue, Arrow Street, and a segment of Perimeter Road off of Skeel Avenue.

Preclosure Reference. Preclosure (1990) and closure (1993) conditions on key roads in the vicinity are summarized in Table 3.2-3. The table shows hourly capacity, traffic volumes, and the corresponding LOS during peak hours of the peak month (July) for key roads.

Table 3.2-3. July Peak-Hour Traffic Volumes on Key Roads

		Preclosure (1990)		Closure (1993)	
Road	Capacity	Traffic	LOS	Traffic	LOS
U.S. 23 (at F-41 junction)	3,300	4,500	F	2,600	E
County Road F-41 (Cedar Lake Road to Skeel Avenue)	5,500	2,100	B	400	A
County Road F-41 (Skeel Avenue to Rea Road)	2,500	500	B	300	A
Cedar Lake Road	2,500	850	C	250	A
Loud Road	2,500	250	A	100	A
River Road	2,500	650	C	200	A
Rea Road	2,500	150	A	150	A
Bissonette Road	2,500	150	A	150	A

The most critical preclosure traffic conditions are concentrated along the urban section of U.S. 23 extending through Au Sable and Oscoda. U.S. 23 operates at LOS F at the junction with County Road F-41 in Oscoda, at LOS

D at the north Iosco County line, and at LOS E along most other segments. The preclosure LOS along County Road F-41 between U.S. 23 and Rea Road is B or better. Cedar Lake Road in the vicinity of the F-41 intersection and River Road at the rail crossing both operate at LOS C. All other local roads operate at LOS A. On-base roads operate at LOS B or better throughout the year, except Skeel Avenue, which operates at LOS C during the peak hour.

Closure Baseline. Upon closure of Wurtsmith AFB, traffic in the vicinity of the base will decrease. Traffic generated by the base will primarily be limited to the 50-person OL team. Off-site traffic on key roads will change in correlation with the cumulative effects of population changes (growth, in- and out-migration) and with future land uses. Table 3.2-3 shows the performance of key roads for closure conditions.

Upon base closure, the LOS along U.S. 23 through Oscoda and Au Sable will improve from E to D; at the F-41 junction, the LOS will improve from F to E. All other local road segments will operate at LOS A throughout the year, compared to LOS C or better in 1990. Traffic on base will be limited to the movement of the OL team, which, when compared to preclosure conditions, will be minimal. The resulting traffic volumes are likely to be less than 50 vehicles per day. All on-base roads will operate at LOS A.

Public Transportation. The major intercity bus route in the area is provided by Greyhound from Bay City to Alpena via U.S. 23. The Iosco Transit Corporation, in East Tawas, operates six 20-seat buses between Oscoda and Tawas. School children and the elderly are the main customers. Upon closure of Wurtsmith AFB, there will be minimal change in bus traffic on key regional roads, a reduction in school bus traffic on local roads, and no bus traffic on base roads.

3.2.3.2 Airspace/Air Traffic. Airspace is a finite resource that can be defined vertically and horizontally, as well as temporally, when describing its use for aviation purposes. As such, it must be managed and utilized in a manner that best serves the competing needs of commercial, general, and military aviation interests. The FAA is responsible for the overall management of airspace and has established different airspace designations that are designed to protect aircraft while operating to or from an airport, transitioning en route between airports, or operating within special use areas identified for defense-related purposes. Rules of flight and ATC procedures have been established that govern how aircraft must operate within each type of designated airspace. All aircraft operate under either instrument flight rules (IFR) or visual flight rules (VFR).

The type and dimension of individual airspace areas established within a given region and their spatial and procedural relationships to one another are contingent upon the different aviation activities conducted in that region. When any significant change is planned for this region, such as airport

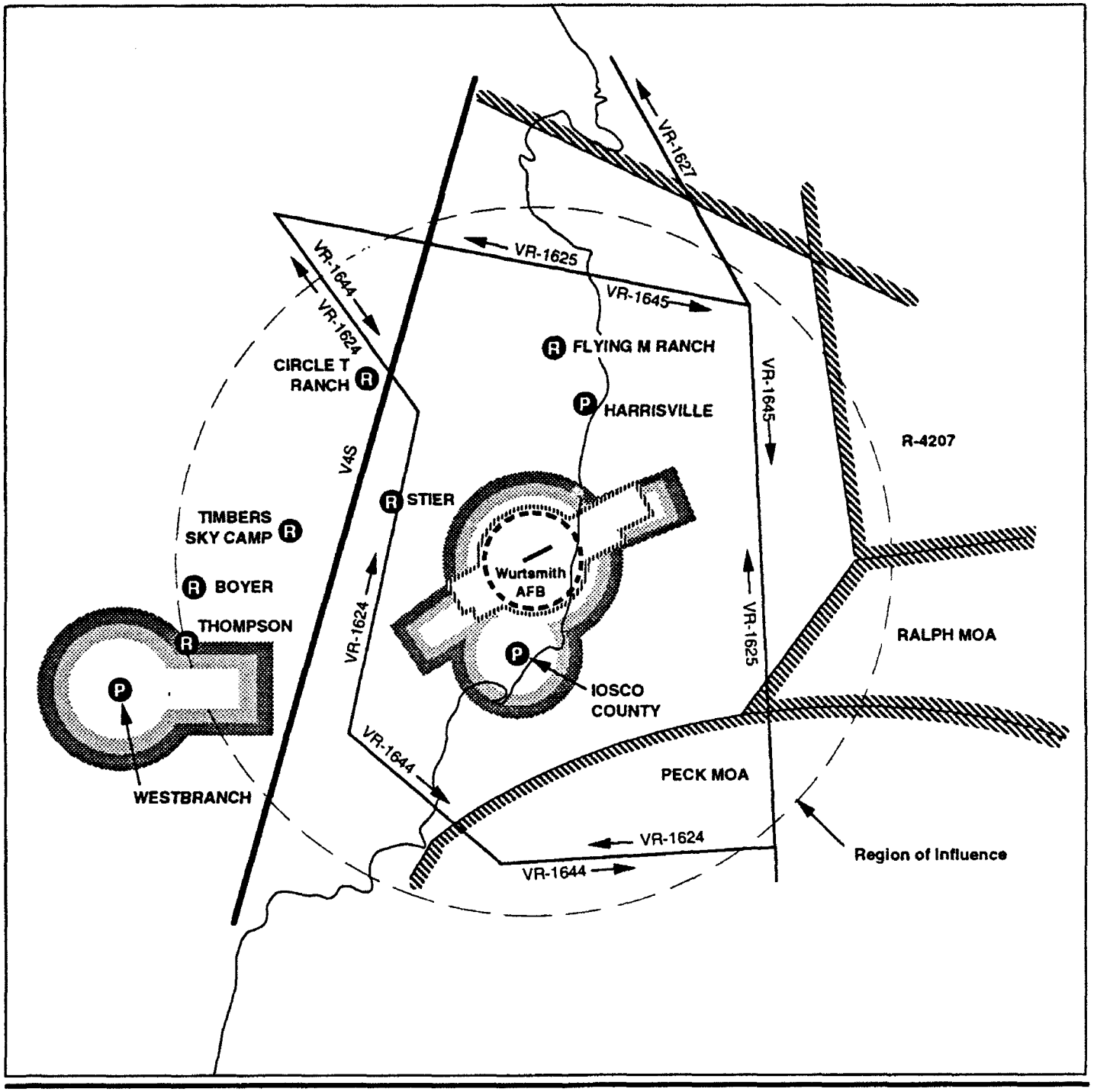
expansion, a new military flight mission, etc., the FAA will reassess the airspace configuration to determine if such changes will adversely affect (1) ATC systems and/or facilities, (2) movement of other air traffic in the area, or (3) airspace already designated and used for other purposes (i.e., Military Operating Areas [MOAs] or restricted areas).

Airspace ROI. The ROI selected for this study is an area within a radius of 26 statute miles of Wurtsmith AFB from the surface up to 12,000 feet mean sea level (MSL) (Figure 3.2-11). The ROI selected for Wurtsmith AFB represents the airspace that has been delegated to Wurtsmith Radar Approach Control (RAPCON) for providing approach and departure control for all IFR aircraft. The airspace controlled by Wurtsmith RAPCON is bounded by airspace controlled by Minneapolis Air Route Traffic Control Center (ARTCC) to the west, Toronto ARTCC to the north and east, and Cleveland ARTCC to the south. Airspace above 12,000 feet in the geographical area of the ROI is controlled by Minneapolis ARTCC.

The Wurtsmith ROI contains controlled, uncontrolled, special use, and other airspace. Controlled airspace within the Wurtsmith ROI consists of control areas, CZs, and transition areas. Within these areas some or all aircraft may be subject to ATC. Safety, user's needs, and volume of flight operations are some of the factors considered in the designation of controlled airspace. Controlled airspace is supported by ground communications, navigational aids, and air traffic services. Special use airspace within the ROI consists of a restricted area and MOAs. Special use airspace is delineated in areas wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of these activities or both. Uncontrolled airspace is that portion of the airspace that has not been designated as controlled airspace. Aircraft operating in uncontrolled airspace are not subject to any ATC. Other airspace within Wurtsmith's ROI includes an airport advisory area, military training routes (MTRs), and airport traffic areas.

Two public-use general aviation airports are within the ROI: Harrisville City Airport, 13 miles north of Wurtsmith near U.S. 23, and Iosco County Airport, approximately 10 miles south of the base. Also within the ROI are six restricted/private-use airports: Boyer, 30 miles west of Wurtsmith; Circle T Ranch, 21 miles northwest; Flying M Ranch, 17 miles north; Stier, 13 miles west-northwest; Timbers Sky Camp, 21 miles west; and Thompson, 31 miles west-southwest.

Aircraft operations associated with Wurtsmith AFB do not conflict with operations or air traffic flows at Iosco County or Harrisville airports. Military aircraft flying under VFRs avoid air traffic conflicts through the use of flight tracks that remain well clear of flight tracks used by civilian aircraft. For aircraft operating under IFRs, ATC tower personnel are responsible for



EXPLANATION

- Public Use Airport
- Restricted/Private Use Airport
- Wurtsmith AFB Control Zone
- Wurtsmith AFB Airport Traffic Area
- Military Training Route
- Airspace ROI
- Federal Airway
- Transition Area (Floor at 700 Feet Above Ground Level)
- Transition Area (Floor at 1200 Feet Above Ground Level)
- Special Use Airspace Area

0 3 6 12 Nautical Miles

Airspace Region of Influence

Figure 3.2-11

ensuring that no air traffic conflicts occur between participating IFR aircraft and any other air traffic.

Preclosure Reference. An understanding of the ROI airspace/air traffic environment and its use under the preclosure reference is necessary to help determine its capability and capacity to assimilate future activities into the National Airspace System.

The Wurtsmith AFB RAPCON has been delegated airspace by Minneapolis ARTCC to provide control of the IFR traffic. Wurtsmith AFB provides ATC services to all aircraft operating under IFR flight rules within the ROI. Additional services are also provided to aircraft operating under VFR flight rules, if specifically requested. Overall, the Wurtsmith RAPCON provides service to a low volume of air traffic.

The traffic patterns, instrument approaches, and departure procedures used at Wurtsmith AFB under preclosure conditions basically represent the airspace requirements for aircraft operating at the base and transitioning between the base and the en route airspace system. Approximately 62,500 aircraft operations were conducted at Wurtsmith AFB in 1990. These operations were conducted by both transient aircraft and aircraft based at Wurtsmith AFB (Table 3.2-4).

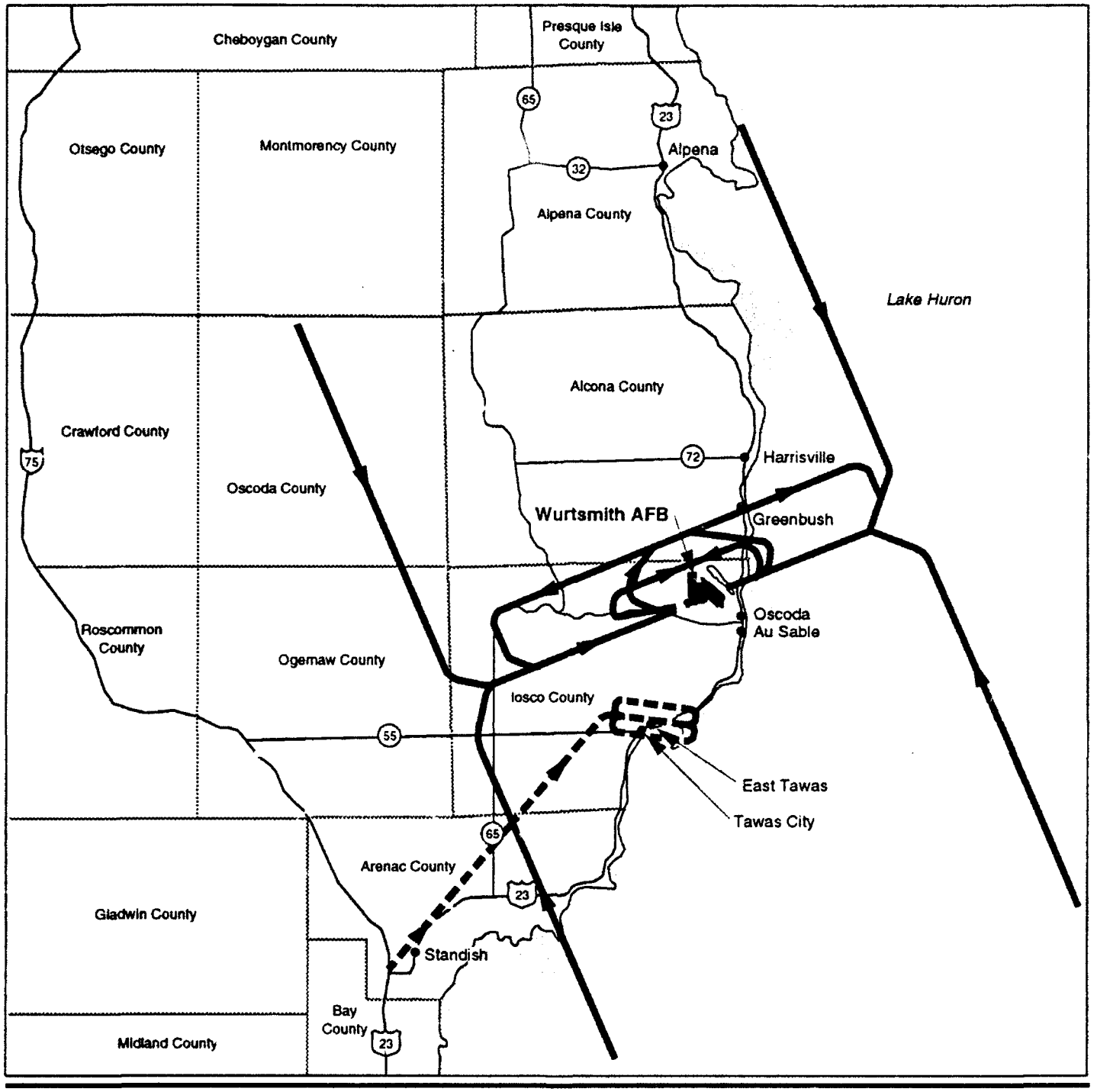
Table 3.2-4. Wurtsmith AFB Annual Aircraft Operations, 1990

		Aircraft Operations[a]		
Assignment	Type	Day	Night	Total
Aircraft based at Wurtsmith	B-52G	20,254	1,369	21,623
	KC-135A	13,848	1,548	15,396
	T-37	20,316	0	20,316
Primary transients	F-16	1,394	0	1,394
	P-3	934	0	934
Other transients	Misc.	2,847	0	2,847
Total		59,593	2,917	62,510

Note: (a) An aircraft operation is one takeoff or one landing.

Figures 3.2-12 and 3.2-13 depict the primary flight tracks for aircraft arriving at or departing from Wurtsmith AFB and Iosco County Airport. No definable flight tracks exist for Harrisville's airport.

Airspace that is delineated for military flight training within the ROI includes a portion of the Peck and Ralph MOAs and Restricted Area R-4207 (see Figure 3.2-11). The Peck MOA, approximately 17 statute miles southeast of Wurtsmith AFB, extends from 4,000 up to, but not including, 18,000 feet



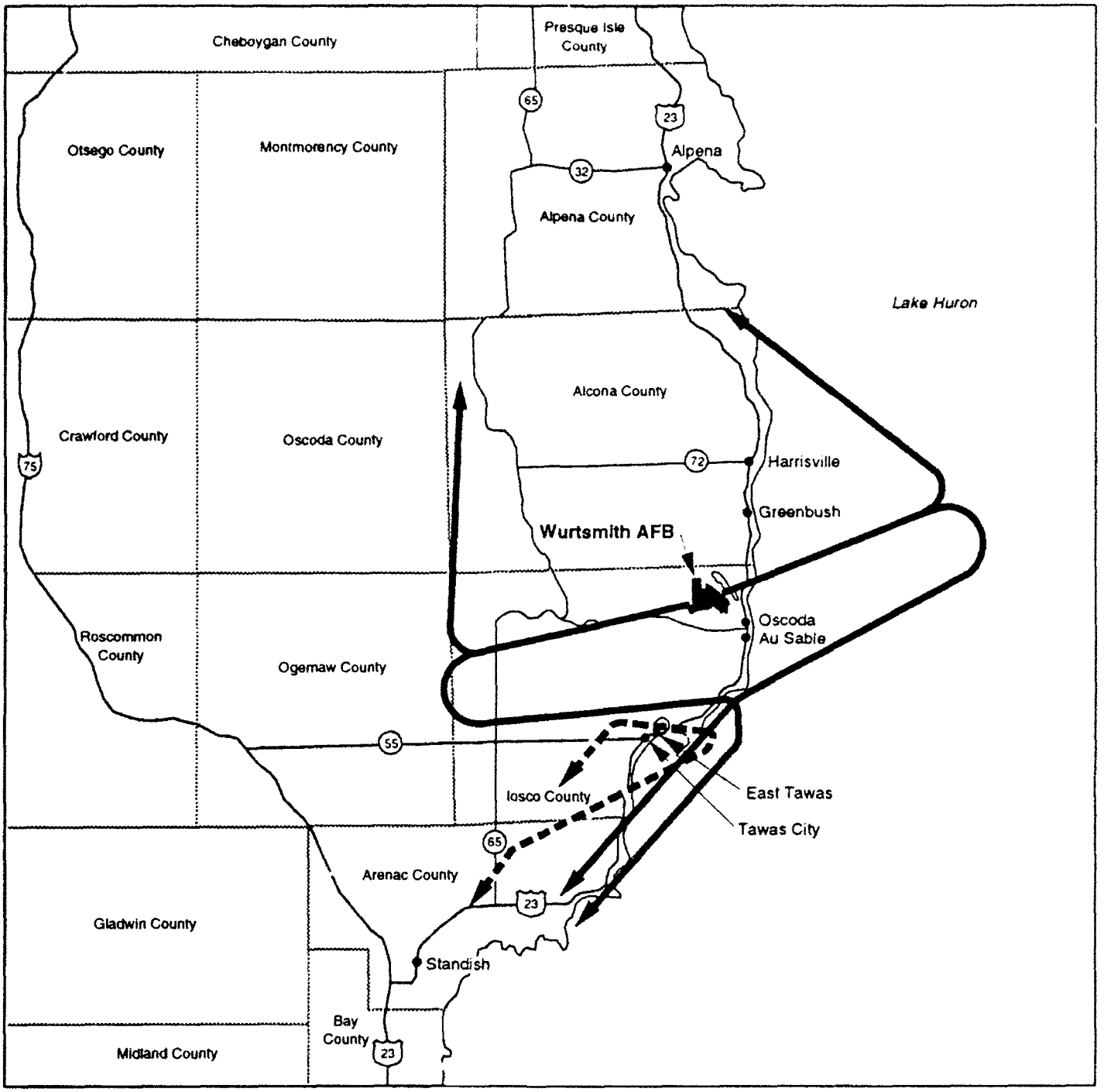
EXPLANATION

- Arriving Flight Paths for Wurtsmith AFB
- Arriving Flight Paths for Iosco County Airport

Primary Arriving Aircraft Flight Paths (Preclosure Condition)

0 3.5 7 14 Miles

Figure 3.2-12



EXPLANATION

- Departing Flight Paths for Wurtsmith AFB
- Departing Flight Paths for Iosco County Airport

0 3.5 7 14 Miles

Primary Departing Aircraft Flight Paths (Preclosure Condition)

Figure 3.2-13

MSL and is continuously in effect. The 127th Tactical Fighter Wing at Selfridge AFB owns the Peck MOA and operates F-16, A-7, T-37, Lear 25, KC-135, and F-18 aircraft in it. Ralph MOA, approximately 22 statute miles east of Wurtsmith AFB, extends from the surface up to, but not including, 18,000 feet MSL and is in effect from 8 a.m. to 5 p.m. It is used by F-16, A-7, T-37, Lear 25, and KC-135 aircraft. Restricted Area R-4207, approximately 22 statute miles northeast of Wurtsmith AFB, extends from the surface to 45,000 feet MSL, and is in effect from sunrise to sunset. F-16, A-7, T-37, Lear 35, KC-135, and B-52 aircraft are operated in this airspace. The Phelps-Collins Air National Guard base at Alpena owns the Ralph MOA and Restricted Area R-4207.

Five MTRs transit the Wurtsmith ROI: VR-1624, VR-1625, VR-1627, VR-1644, and VR-1645. These routes are all for flight training of military aircraft at or below 1,500 feet (above ground level). Flights on these routes are conducted only in VFR weather conditions. The 127th Tactical Fighter Wing at Selfridge AFB owns the MTRs and uses them for F-16 aircraft operations.

Aircraft operating at the Iosco and Harrisville public airports are generally unaffected by flight operations at Wurtsmith AFB. The Wurtsmith AFB airport traffic area has a radius of 5 statute miles from the airport and extends from the surface up to, but not including, 3,000 feet above ground level. Aircraft stay outside the Wurtsmith AFB airport traffic area or contact the Wurtsmith tower when transitioning through that airspace. Table 3.2-5 presents preclosure (1991) and projected closure (1993) operations at these two airports.

Table 3.2-5. Projected Annual Aircraft Operations for Civil Public-Use Airports in the Vicinity of Wurtsmith AFB

	Annual Operations	
Airport	1991	1993
Harrisville	1,800	2,000
Iosco County	7,500	8,100

Source: FAA, 1991.

Closure Baseline. Upon base closure and the termination of flight operations at Wurtsmith AFB, all designated ATC airspace areas and published instrument procedures would be canceled and the area would revert back to control by Minneapolis ARTCC. The RAPCON, control tower, and navigational aids would be removed from service, pending any reuse requirements for these facilities. It is not likely that the airspace would be used by Minneapolis ARTCC for new IFR transit routes. VFR aircraft operating from the surrounding public and private airports could transit freely

through the airspace surrounding the closed airfield without any tower communication requirements or concerns with military aircraft operations. The MTRs transitioning the ROI should be unaffected because these routes were not used by Wurtsmith AFB aircraft and will remain in use by military aircraft from other bases. Restricted area R-4207 and the Peck and Ralph MOAs will continue to support ongoing DOD missions. Air traffic on the federal airways transitioning the ROI would no longer be affected by military aircraft arriving and departing Wurtsmith AFB.

3.2.3.3 Air Transportation. Air transportation includes passenger travel by commercial airline and charter flights, business and recreational travel by private aircraft (general aviation), and priority package and freight delivery by commercial carriers.

The Wurtsmith AFB ROI contains no airports that support commercial passenger service. The nearest airport with significant passenger service is Tri-City International, near Saginaw, approximately 90 miles south of Oscoda, which is well beyond the airspace ROI for Wurtsmith AFB. Iosco County travelers use Tri-City for commercial passenger service. Scheduled passenger service is also offered at Alpena Regional Airport, 45 miles north of the base. Two public-use general aviation airports are within the ROI: Harrisville City Airport, 13 miles north of the base, and Iosco County Airport, 10 miles south of the base. There are also six restricted/private-use airports within the ROI.

Preclosure Reference. Iosco County had scheduled passenger service in 1988, but the service was discontinued in 1989 due to low passenger levels. Neither public-use airport had scheduled passenger service in 1990. There is currently a limited level of general aviation passenger and cargo demand at Iosco County Airport. Annual levels of passenger and cargo are not definable for such a small operation, because many of the occurrences are not scheduled or recorded by the company in question.

Closure Baseline. The Iosco County Airport would remain open. There would be a negligible reduction in air passenger traffic through Tri-City and Alpena airports due to the relocation of base personnel and dependents who currently use these airports.

3.2.3.4 Other Transportation Modes. There is no rail passenger service in the area. The closest intercity rail route (AMTRAK) is the Kalamazoo-Lansing-Flint-Port Huron-Toronto line, 140 miles south of the base. Rail freight service to northeastern Michigan is provided by the Detroit and Mackinac rail system, headquartered in Tawas City. Two trains per day pass through Tawas City. Early in 1992, the railroad was sold to Lake State Railway Company. Since the 1950s, rail freight has been declining and losing markets to trucks. In the ROI, there is one-way track with at-grade crossings and many sharp curves, which appreciably reduce the average

speed. Rail freight service to Wurtsmith AFB, primarily carrying JP-4 fuel, is provided by an on-base spur. Upon closure of Wurtsmith AFB, there will be no jet fuel hauled to the base.

Major ports on Lake Huron are at Alpena to the north and Bay City to the south. Within Iosco County, there are two docks just south of Tawas City where gypsum from the local quarry is loaded.

3.2.4 Utilities

The utility systems addressed in this analysis include the facilities and infrastructure used for:

- Potable water pumping, treatment, storage, and distribution
- Wastewater collection and treatment
- Solid waste collection and disposal
- Energy generation and distribution, including the provision of electricity, natural gas, and central heating systems.

The ROI for each utility is made up of the service areas of that utility provider serving the base and local communities that would be most affected by the disposal and reuse of Wurtsmith AFB. The major attributes of utility systems are processing and distribution capacities, storage capacities, and related factors such as average daily consumption and peak demand that are required in making a determination of adequacy of such systems to provide services in the future.

Utility consumption is projected to decrease from 1990 until June 1993 (closure) as the base-related population decreases. Table 3.2-6 presents the projected utility consumption in the ROI from 1990 to closure, based on population projections and available data for each utility service area.

3.2.4.1 Water Supply

On-Base. Wurtsmith AFB currently derives its water for domestic use from on-base wells drilled into a shallow groundwater aquifer. This aquifer extends to a depth of about 65 feet and is composed of sand and gravel deposits. Underlying the aquifer are silty clays and, at a depth of 200 to 250 feet, bedrock. The total pumping capacity of the seven currently active wells is 2.2 MGD. In areas where groundwater contamination has been identified, restrictions have been placed on the locations and amount of water that can be pumped. The water at each well is chlorinated, fluoridated, and pumped directly into the water distribution system. The Michigan Department of Public Health indicated that the on-base wells could

Table 3.2-6. Estimated Utility Consumption[a]

	1990	1991	1992	1993[b]
Water consumption (MGD)	2.23	2.23	2.04	1.51
Wastewater treatment (MGD)	1.82	1.79	1.67	1.22
Solid waste disposal (tons/day)	45	45	38	21.6
Electrical consumption (MWH/day)	227	231	202	92
Natural gas consumption (thousand therms/day)	31.9	31.7	28.5	19.0

Notes: (a) For each utility service area.
(b) Represents estimated daily consumption at closure in June 1993.

be used after closure, provided that extensive testing is conducted to monitor contaminant levels (Wade-Trim/Edmands, 1992). On-base water usage in 1990 averaged 0.62 MGD; use is projected to decline to 0.20 MGD by June 1993.

Domestic water storage capacity at the base consists of two elevated 300,000-gallon tanks and one 200,000-gallon tank at ground level. In addition, a 100,000-gallon ground-level tank with backflow protection adjacent to the WSA feeds a separate fire protection hydrant system.

Off-Base. The water storage and distribution system requirements for pressure, domestic, fire, and sprinkler demand are met by two systems: the Oscoda Township water system and the East Tawas water system.

The Oscoda Township water supply system serves Oscoda and Au Sable from nine wells. Seven wells along River Road (west of the railroad) pump water from the same aquifer at depths of approximately 50 feet. Two wells on the east side of Van Etten Lake pump water from a different aquifer with high iron content; an iron removal plant was constructed and placed in service in 1991. The nine wells can provide a total capacity of 1.9 MGD; usage in 1990 was 0.8 MGD. The Oscoda Township storage system consists of one 1-million-gallon elevated tank and one 400,000-gallon elevated tank.

The East Tawas water system draws its water from Lake Huron and serves Tawas City, the city of East Tawas, and part of Baldwin Township. East Tawas is constructing a new plant at Tawas Point to replace the existing plant. In 1990, Tawas City and East Tawas used 0.77 MGD. The new plant will be able to produce 3.5 MGD; the intake from Lake Huron is sized to accept 7 MGD. Storage in the Tawas City/East Tawas/Baldwin water system consists of one 500,000-gallon ground tank and two 500,000-gallon elevated tanks.

3.2.4.2 Wastewater

On-Base. Domestic sewage at Wurtsmith AFB is discharged to the base sanitary sewer system. The base collection system consists of a main gravity pipe and ten sewage lift stations, built between 1959 and 1982. Sewage influent is first collected and screened at a facility south of the cantonment area (originally a treatment plant), then pumped 2.5 miles to three aerated ponds with impermeable membrane liners. Under average flow conditions, the sewage is retained for 30 days prior to release into seepage beds. The effluent is discharged from the seepage beds into the groundwater, and ultimately drains into the Au Sable River. The treatment system is designed for average flows of 1.0 MGD, with a 0.5 MGD minimum and a 3.0 MGD maximum capacity. In 1990, the base produced an average of 0.48 MGD of wastewater. The system, which provides secondary treatment, is designed to remove an estimated 90 percent of biological oxygen demand and 70 to 90 percent of suspended solids.

Discharge to groundwater from the sewage lagoons is regulated by an MDNR Groundwater Discharge Permit. The permit expired in October 1988 and was not renewed because the discharge could not meet new state guidelines for nitrogen of 5 milligrams per liter. The base was working with the MDNR to develop a new plan when the base closure was announced. The base has completed a hydrogeological survey and is currently negotiating a Memorandum of Agreement with the U.S. Forest Service to ensure that no potable water wells will be installed downgradient of the effluent discharge. An application for a new permit and variance has been submitted to allow continued operation of the sewage lagoons. An NPDES permit is not required because there is no discharge to surface waters.

At closure, the average daily flow from OL activities would be 0.01 MGD.

Off-Base. The ROI for wastewater collection, treatment, and disposal consists of the communities of Oscoda and Au Sable and, to some extent, East Tawas and Tawas City. Williams and Works Operation Services, a private company, currently operates the two wastewater treatment plants (WWTP) in Oscoda and Tawas City.

The Oscoda sewage collection system consists of a network of sewers conveying the sanitary sewage to the 11 lift stations and ultimately to the treatment plant. In general, flow through the sewer mains is by gravity. The wastewater is treated using the extended aeration mode of the activated sludge process. Clarified secondary effluent is disinfected with chlorine and dechlorinated with sulfur dioxide (SO_2) prior to discharge in the Au Sable River. The Oscoda plant, built in 1975, has a design capacity of 0.8 MGD and serves Oscoda and Au Sable townships. In 1990, the system treated an average of 0.23 MGD.

East Tawas and Tawas City share a more modern wastewater treatment plant. As in the Oscoda plant, the wastewater is treated using the extended aeration mode of the activated sludge process. The clarified secondary effluent is disinfected with chlorine and dechlorinated prior to discharge into the Tawas River. The design flow is 2.4 MGD; in 1990, flows averaged 1.08 MGD.

3.2.4.3 Solid Waste. Refuse generated at Wurtsmith AFB consists of paper, garbage, glass, metal, and other general municipal and construction refuse. Solid waste generated on base and in the ROI is hauled by an independent contractor to the Tawas transfer station, then to the Pinconning Landfill, an MDNR-permitted sanitary landfill. The landfill is about 60 miles south of the base, in Bay County. This landfill is currently used by 12 counties including Iosco; it has an area of 104 acres and has a life span of 20 more years. There are no permitted landfills in Iosco County.

Upon base closure, Wurtsmith AFB will generate minimal amounts of solid waste associated with OL maintenance of buildings and grounds. The amount of solid waste generated off base will decrease in proportion to population out-migration.

3.2.4.4 Energy

Electricity

On-Base. Wurtsmith AFB purchases its electric power from Consumers Power Company (CPCO). At the main substation on base, the power is allocated to two distribution systems: two 2,500-kilovolt-ampere (kVA) transformers supply power to central base facilities and a 5,000-kVA transformer supplies power to family housing. The three transformers are owned by CPCO. The primary distribution system is an ungrounded delta system that delivers 12 kilovolts (kV) through primarily overhead and some underground lines. Currently, the distribution system is operating near capacity: the peak electrical demand regularly exceeds 9,000 kVA; the substation capacity is 10,620 kVA. Electrical consumption for the base has decreased since 1985, when the family housing was converted to natural gas for water heating and cooking.

Off-Base. Electrical energy to the ROI is supplied by CPCO through a 46-kV transmission line from the Bay City, Weadock, and Karn steam plants, via Tawas to Alpena (parallel to U.S. 23).

Natural Gas

On-Base. Natural gas is supplied to Wurtsmith AFB by Michigan Consolidated Gas Company (MichCon). Natural gas has been used on base

or water heating and cooking purposes since 1985. Natural gas has also been used as the primary fuel for the central heating plant since 1987.

Off-Base. MichCon supplies the ROI with natural gas, which is used primarily for residential heating. There are no constraints to the natural gas supply in the region.

On-Base High Temperature Hot Water Heating System. The majority of the Wurtsmith AFB cantonment area, including the hospital, dormitories, and several buildings is served by a central heating plant consisting of four high-temperature hot water generators. The generators were converted from No. 2 fuel oil to natural gas in 1987; No. 2 fuel oil is still used as a backup. The plant provides heating as well as hot water for domestic use. The base utilizes underground mains, consisting of two pipes (supply and return), providing hot water at 400°F and 250 pounds per square inch. The plant was installed in the late 1950s and has exceeded its 25-year design life. Improvements to the plant, as well as continuous maintenance and surveillance by skilled technicians, are required to keep the plant in operating condition.

The average demand on the plant in 1990 was 56 million British thermal units (MBTU) per hour; the capacity is 81 MBTU per hour. The total energy produced for the highest month of 1990 (February) was about 34,000 MBTU; during the summer, energy production was reduced to 5,000 MBTU. Upon base closure, the maintenance cost of the central heating plant would make its continued operation uneconomical for the small size of the OL.

3.3 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

Hazardous materials and hazardous waste management activities at Wurtsmith AFB are governed by specific environmental regulations. For the purpose of the following analysis, the term hazardous waste or hazardous materials will mean those substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§9601-9675, as amended, and the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§6901-6992, as amended. In general, this includes substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or welfare or the environment when released into the environment. The State of Michigan defines hazardous substances under Section 3(P) of the Michigan Environmental Response Act (MERA) 307, Michigan compiled laws 299.603(P), which is enforced by the MDNR.

Transportation of hazardous materials is regulated by the DOT regulations within Chapter 49 of the Code of Federal Regulations (CFR). Part 4 of the

Michigan Hazardous Waste Management rules, R299.9401 to R299.9412, addresses state regulations regarding transporting hazardous waste.

Treatment and disposal of nonhazardous waste, including wastewater, is discussed in Section 3.2.4, as part of utilities.

The ROI encompasses all geographic areas that are exposed to the possibility of a release. The ROI for IRP sites is within the existing base boundaries, with the exception of groundwater contamination plumes that extend beyond the base boundary in the northeast, east, and south-central portions of the base. Specific geographic areas affected by past and current hazardous waste operations, including remediation activities, are presented in detail below.

3.3.1 Hazardous Materials Management

Preclosure Reference. Wurtsmith AFB receives, stores, and uses large quantities of hazardous materials. The most commonly utilized include aviation and motor fuels, various grades of petroleum products, lubricants, hydraulic fluids, solvents, paints, thinners, and compressed gases. These materials are delivered through base supply (Building 379) and the Contract and Government Operated Civil Engineering Supply Systems (COCESS and GOCESS), and from this point distributed to the workplaces in which the materials are used, with the exception of solvents from Safety Kleen and bulk fuel deliveries (see Section 3.3.4).

The Hazardous Waste Management Plan (HWMP) (U.S. Air Force, 1985a) provides an outline and guidance for storage, handling, and disposal of hazardous substances at Wurtsmith AFB. The HWMP also provides a contingency plan identifying key personnel, responsibilities, and procedures to follow in the event of a hazardous substance spill.

A repository of Material Safety Data Sheets (MSDSs) for all hazardous materials utilized on base is managed by base Bioenvironmental Engineering. MSDSs are also available at base supply, and each workplace has MSDSs for each hazardous material utilized or stored at that location.

Closure Baseline. After base closure, only the OL will be using hazardous materials. All parties will be responsible for managing these materials in accordance with federal, state, and local regulations to protect employees from occupational exposure to hazardous materials and to protect the public health of the surrounding community. This would be accomplished by adhering to the community right-to-know requirements set forth under the Superfund Amendments and Reauthorization Act (SARA), Title III, of 1986.

The OL will be responsible for the safe storage and handling of all hazardous materials used in conjunction with preventive and regular maintenance

activities, grounds maintenance, and water and wastewater treatment. Hazardous materials may include paint, paint thinner, solvents, corrosives, ignitables, pesticides, and miscellaneous materials associated with vehicle and machinery maintenance (motor oils/fuels). These materials will be delivered to the base in compliance with the federal Hazardous Materials Transportation Act (HMTA) under 49 CFR.

3.3.2 Hazardous Waste Management

Preclosure Reference. Normal operations at Wurtsmith AFB currently produce wastes defined as hazardous by RCRA, 40 CFR 261-265, and by the Michigan Administrative Code, R299.9101 to R299.11107, Hazardous Waste Management Rules.

The Environmental Compliance Office oversees the management of hazardous wastes at Wurtsmith AFB. The base is currently operating under an RCRA Interim Part A Hazardous Waste Storage permit issued by EPA Region V. Under this permit, hazardous wastes can be stored in the DRMO facility for up to 1 year. Hazardous wastes generated on base are collected in drums at 22 satellite accumulation points located at various industrial area and flightline facilities that generate hazardous wastes (Table 3.3-1). Most of the accumulation points are designated recycling points and are used to collect waste oils and solvents, which are regularly picked up and recycled by an outside contractor. The Recoverable and Waste Liquid Petroleum Products Management Plan (U.S. Air Force, 1986) was implemented in 1986 to govern the handling, storage, marking, and disposal of base recoverable and waste petroleum products, which are considered nonhazardous under the Michigan Recycling and Reuse Laws R319.11-R319.316.

Accumulation points can store hazardous waste for up to 90 days. All accumulation points are regularly inspected by Environmental Compliance Office personnel. Prior to expiration of permitted time frames, wastes are transferred to the DRMO storage facility (Building 5606), located at the northern tip of the base. DRMO utilizes a permitted contractor for disposal of these wastes to a permitted facility off base.

An estimated 340,000 pounds of RCRA and non-RCRA wastes were generated by operations at Wurtsmith AFB in 1991. RCRA wastes are considered hazardous due to their physical and chemical characteristics and their potential to harm humans and the environment. Non-RCRA wastes are defined wastes excluded from hazardous waste regulation and include recyclable wastes (except for sludge or listed wastes). Non-RCRA waste constituted approximately 240,000 pounds, or 70 percent of all waste generated by the base. Approximately 53 percent of wastes generated on base were recycled; all other wastes were disposed through DRMO.

Table 3.3-1. Hazardous Waste Accumulation Points

Site	Location (Building #)	Description
Accumulation Points (90-day storage)		
1	16[a]	Fire Truck Maintenance
2	43[a]	Propulsion Branch
3	140[a]	Pavement/Grounds
4	201[a]	Zone - 1 Maintenance
5	290[a]	Vertical Construction
6	305[a]	Heat Plant
7	385[a]	Power Production
8	388[a]	Auto Hobby Shop
9	394[a]	Vehicle Maintenance
10	460[a]	Service Station
11	5008[a]	Hydraulics Shop
12	5009[a]	Flight Maintenance
13	5043[a]	Munitions Maintenance
14	5059[a]	Flight Maintenance - Nose Docks
15	5058	Flight Maintenance
16	5306[a]	Weapons Storage Area
17	7006	Munitions Maintenance
18	7007	Vehicle Maintenance
19	7008	Flight Maintenance
20	7009	Propulsion Branch
21	7010	Corrosion Control
22	7011	Civil Engineering Storage
Storage Facility		
1	5606	DRMO

Note: (a) Designated recycling points.

Personnel housed on base dropped off hazardous household products at the U-Fix-It store (Building 9421).

Closure Baseline. At the time of base closure, all of the hazardous waste generated by base functions will have been collected from all designated accumulation points and transferred to DRMO prior to final disposal off site. In accordance with RCRA, the closure plan for the DRMO facility will then be implemented. The plan calls for final facility closure 180 days following

the base closure date. Hazardous waste generated by the OL will be tracked to ensure proper identification, storage, transportation, and disposal, as well as implementation of waste minimization programs.

3.3.3 Installation Restoration Program Sites

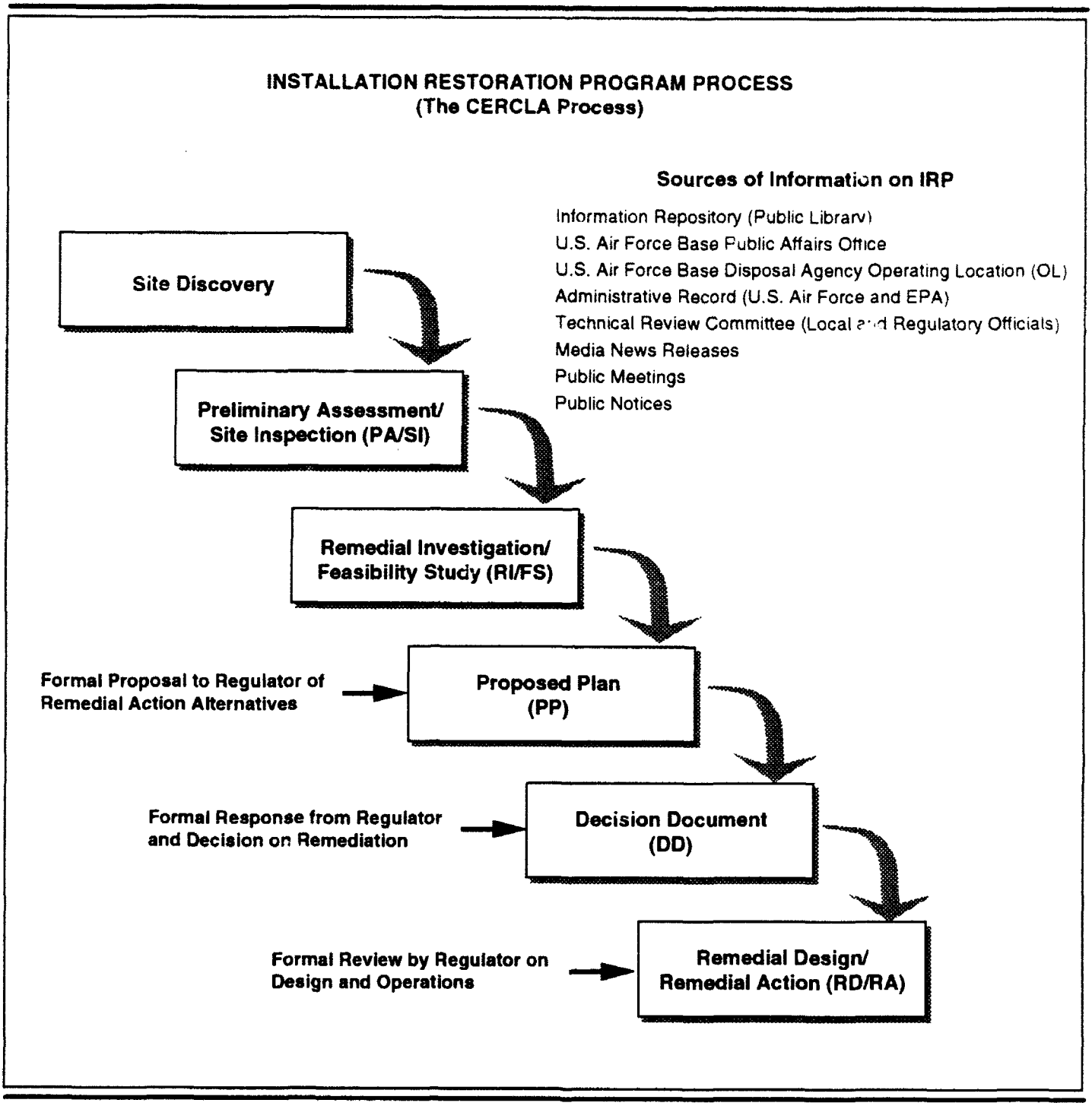
The IRP is an Air Force program to identify, characterize, and remediate past environmental contamination on its installations. Although widely accepted at the time, procedures followed prior to the mid-1970s for managing and disposing of many wastes often resulted in contamination of the environment. The program has established a process to evaluate past disposal sites, control the migration of contaminants, and control potential hazards to human health and the environment. Section 211 of SARA, codified as the Defense Environmental Restoration Program (DERP), of which the Air Force IRP is a subset, ensures that the DOD has the authority to conduct its own environmental restoration programs.

Prior to passage of SARA and the establishment of the National Contingency Plan (NCP) for hazardous waste sites, Air Force IRP procedures followed DOD policy guidelines mirroring the EPA's Superfund Program. Since SARA was passed, many federal facilities have been placed on a federal docket and the EPA has been evaluating the facilities' waste sites for possible inclusion on the National Priorities List (NPL). The EPA has not proposed Wurtsmith AFB for listing on the NPL. The base is currently being reevaluated for possible NPL listing according to the EPA's revised scoring criteria.

Ongoing activities at identified IRP sites may delay or limit some proposed land uses at or near those sites. Future land uses by the recipients on a site-specific level may be, to a certain extent, limited by the severity of contamination or level of remediation effort at these IRP sites. Reasonably foreseeable land use constraints are discussed in this EIS. Regulatory review as required by the Air Force programs will also ensure that any site-specific land use limitations are identified and considered. A representation of the IRP management process followed by Wurtsmith AFB is shown in Figure 3.3-1.

The original IRP was divided into four phases, consistent with CERCLA:

- Phase I: Problem Identification and Records Search
- Phase II: Problem Confirmation and Quantification
- Phase III: Technology Development
- Phase IV: Corrective Action.



Pictorial Presentation of IRP Process

Figure 3.3-1

After SARA was passed in 1986, the IRP was realigned to incorporate the terminology used by the EPA and to integrate the new requirements in the NCP. The result was the creation of three action stages:

- Preliminary Assessment/Site Inspection (PA/SI)
- Remedial Investigation/Feasibility Study (RI/FS)
- Remedial Design/Remedial Action (RD/RA).

The PA portion of the first stage under the NCP is comparable to the original IRP Phase I and consists of a records search and interviews to determine if potential problems exist. A brief SI that may include soil and water sampling is performed to give an initial characterization or confirm the presence of contamination at a potential site.

An RI is similar to the original Phase II and consists of additional fieldwork and evaluations in order to assess the nature and extent of contamination. It includes a risk assessment and determines the need for site remediation.

The original IRP Phase IV has been replaced by the FS and the RD within the third stage. The FS documents the development, evaluation, and selection of remedial action alternatives to remediate the site. The selected alternative is then designed (RD) and implemented (RA). Long-term monitoring is often performed in association with site remediation to assure future compliance with contaminant standards or achievement of remediation goals. The Phase III portion of the IRP process is not included in the normal SARA process. Technology development under SARA is done under separate processes including the Superfund Innovative Technology Evaluation program. The Air Force has an active technology development program in cooperation with the EPA to find solutions to problems common to Air Force facilities.

Wurtsmith AFB has prepared preliminary finished documents for ten IRP sites where groundwater remediation measures are in-place. The final documents will be dependent on the SI results. No Further Action Decision Documents (NFADD) have been submitted to the EPA and the MDNR for approval for four IRP sites where no further remediation is required.

The closure of Wurtsmith AFB will not affect the ongoing IRP. These IRP activities, managed by the OL, will continue in accordance with federal, state, and local regulations to protect human health and the environment, regardless of the disposal decision.

The public may keep abreast of the IRP at Wurtsmith AFB through various sources of information (see Figure 3.3-1). The Air Force will, with the

acceptance of each RI/FS by the regulatory community, prepare a proposed plan for the remediation of a site(s), which will include a discussion of alternatives considered. The proposed plan will be distributed to regulatory agencies for comment. The Air Force will then respond to all comments, making those responses part of a public Decision Document (DD) on what the remediation will entail prior to any remedial action being taken.

Preclosure Reference. In 1977, prior to the initiation of the IRP program, Wurtsmith AFB identified two drinking water wells contaminated with trichloroethylene (TCE) that had leaked from an underground storage tank (UST) near Building 43. The wells were shut down and the Air Force installed a groundwater pump and treat system to inhibit migration of the plume and remediate the contamination. This system involved extraction and aeration of groundwater, which allowed the TCE to volatilize as it came in contact with air; aerated water was then discharged to the sanitary sewer and finally into the WWTP. Carbon filters and an air stripper were added to the system in 1979 and 1982, respectively. These modifications remove or absorb the TCE from the groundwater rather than allow its release into the air. The MDNR issued a National Pollutant Discharge Elimination System (NPDES) permit allowing effluent from the treatment system to be discharged to Van Etten Creek via the storm sewer. The area of groundwater contamination is migrating eastward and is referred to as the Arrow Street Plume. (U.S. Air Force, 1990a.)

In 1979, the U.S. Geologic Survey (USGS) began a series of geologic and hydrologic investigations at Wurtsmith AFB. Monitoring wells indicated the presence of benzene, toluene, and other organic compounds under the petroleum, oil, and lubricants (POL) bulk storage area. The Northern Landfill Plume was discovered during the 1979-1980 investigation and found to be migrating in a northeasterly direction. The contamination included benzene, TCE, and dichloroethylene (DCE), a chemical produced by decomposition of TCE. In 1971, two 6,000-gallon tank trailers were buried in the center of the landfill and used as a central solvent disposal site. In 1979, the trailers were removed and tested for leaks. No leaks were discovered; therefore, the tanks were not the source of contamination.

As a result of the groundwater contamination discovered in 1979, the State of Michigan sued the DOD, despite remediation activities undertaken by the Air Force. The result was a negotiated Consent Decree, signed in 1980, which governs what the Air Force must do to clean up the groundwater contamination on base and that which has migrated off base.

In 1982-1983, the USGS identified a number of additional plumes. The Mission Drive Plume, which originates in the maintenance complex area and migrates south through the military family housing area, is contaminated with TCE and DCE. An exact source of the plume could not be identified. In 1988, the Air Force installed a pump and treat system to remediate and

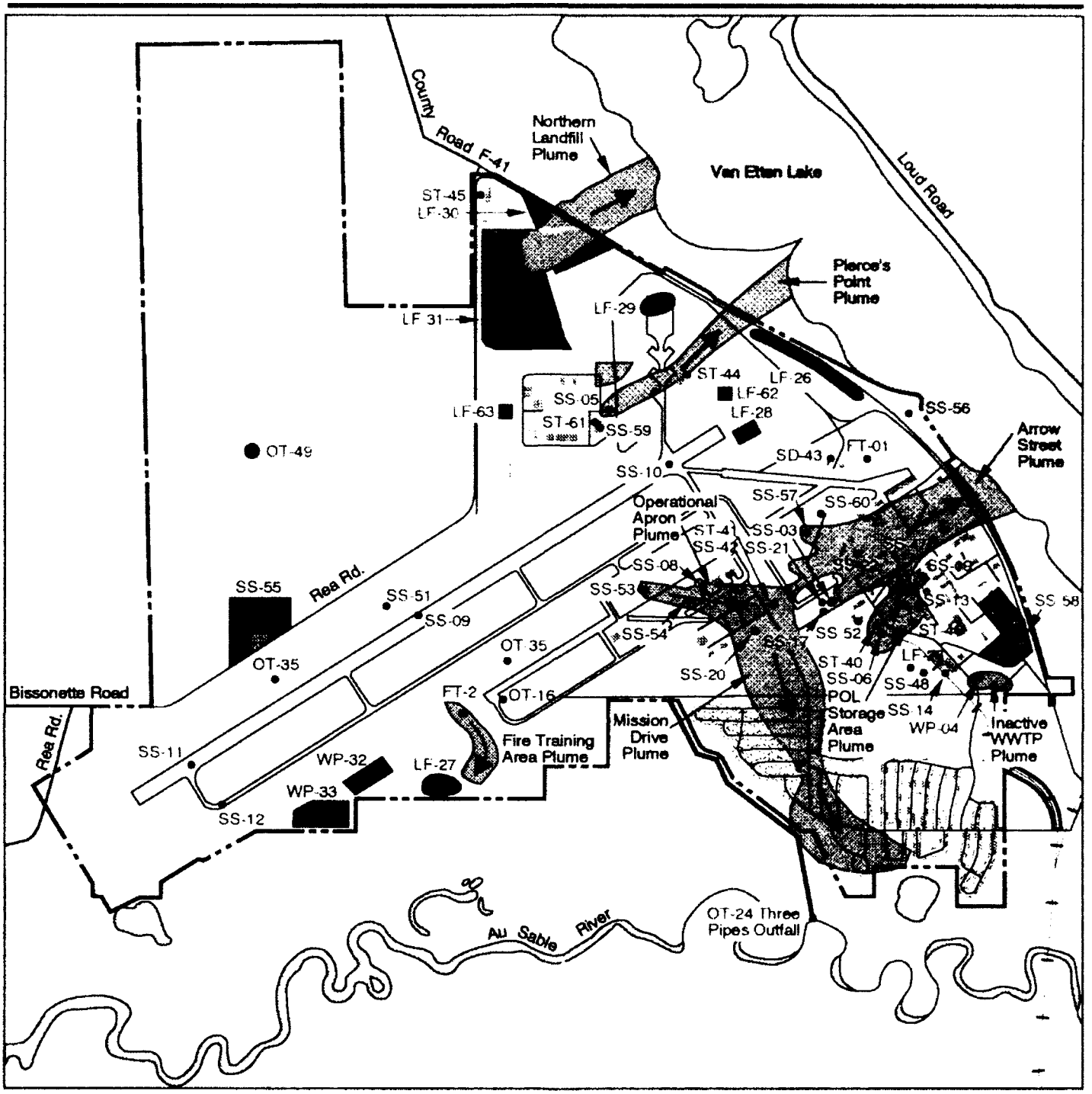
contain the Mission Drive Plume. The 1983 USGS study also identified TCE, DCE, and benzene in the groundwater under the base operational apron. Another plume, the Pierce's Point Plume, was confirmed during the USGS's investigation. This plume originates from the WSA and flows into Van Etten Lake, where it volatizes naturally. The plume was discovered by sampling the drinking water well at an off-base residence. The plume is contaminated with TCE and DCE, and is thought to have originated from an old sump in the WSA, which has been removed.

In 1983, the State of Michigan filed a motion to enforce the Consent Decree. The State contended that the Air Force, by allowing the groundwater contamination from the Pierce's Point and Northern Landfill plumes to flow into Van Etten Lake and volatilize naturally, was considered in breach of the Consent Decree. In 1989 the Federal Court ruled that the Air Force was in compliance with the Consent Decree and was not required to install additional groundwater treatment systems, as requested by the State.

Because the Air Force formally began the IRP process at Wurtsmith AFB in October 1984, prior to terminology and procedural changes, both phases and stages are contained in the IRP administrative record. The IRP Phase I Records Search was published in April 1985. It initially identified 29 potential sites: 7 landfills, 2 fire training areas, 16 spill sites, 2 surface impoundment areas, and 2 sludge drying areas. Since completion of the Phase I study and the USGS groundwater investigations, two sites from the original list were combined and 25 additional possible contamination sites have been identified: 14 spill sites, 7 leaking underground storage tanks, 2 landfills, and 2 surface impoundments. These sites were incorporated into the IRP, due to the potential for contamination. Figure 3.3-2 identifies all 53 IRP sites, as well as the groundwater plumes on and near Wurtsmith AFB. Table 3.3-2 provides a brief description and location of each IRP site. As indicated on the table, the sites have been grouped into six operable units, based on geographic location, to facilitate remediation activities.

An additional pump and treat system was installed and became operational in 1991. The system is remediating and containing the groundwater plume originating from the POL bulk storage yard.

Prior to the transfer of any property at Wurtsmith AFB, the Air Force mus: also comply with the provisions of CERCLA §120(h). CERCLA §120(h) requires that, before property can be transferred from federal ownership, the United States must provide notice of specific hazardous substance activities and conditions on the property and, when there have been any such hazardous substance activities, include in the deed a covenant warranting that all remedial action necessary to protect human health and the environment with respect to any [hazardous] substance remaining on the property has been taken before the date of such transfer. Furthermore, for



EXPLANATION

- IRP Site
- Groundwater Plume
- Direction of Groundwater Flow
- EOD Range Safety Zone
- Base Boundary

0 750 1500 3000 Feet

Installation Restoration Program Sites

Figure 3.3-2

Table 3.3-2. IRP Site Descriptions and Locations
Page 1 of 8

Site No.	Site Name/Location	Site Description
Operable Unit No. 1		
LF-30	Northern Landfill (East)	Landfill is 25 to 30 acres and received domestic and industrial wastes from 1960 to 1973. Two 6,000-gallon tanker trailers were buried on site in 1971 and used as a waste solvent central disposal site. The trailers were excavated in 1979 and found to be free of leaks. Groundwater tests in 1991 detected benzene, TCE, DCE, and vinyl chloride.
LF-31	Northern Landfill (West)	Landfill is 20 to 25 acres and received concrete, asphalt, metals, and paints from 1973 to 1979. Northern 7 acres of the landfill were capped in 1983. Groundwater sampling in 1991 found DCE, TCE, vinyl chloride, and benzene.
ST-45	Leaking Underground Storage Tank, DRMO (Building 5608)	A 1,000-gallon heating fuel tank failed a tightness test and was purged in October 1991; tank has been removed. Leak of product has not been confirmed. No fuel has been detected in the groundwater by two monitoring wells installed at either end of the tank.
Operable Unit No. 2		
LF-26	Miscellaneous Debris Disposal, East of Alert Apron	Coal ash, wood, concrete, and auto parts were believed to be deposited in this landfill from 1949 to 1951.
LF-28	Domestic and Industrial Waste Disposal, East of Runway 24 Overrun	One-acre landfill received domestic and industrial wastes such as waste solvents and organic materials from 1953 to 1958. Interviews with former base personnel indicate that the landfill was removed. Groundwater sampling indicated no contamination; a preliminary finished document was signed in 1991 and will become final dependent upon SI results.
LF-29	Domestic Waste Disposal, Northern Portion of Alert Apron	Domestic waste and base refuse were deposited in this landfill in 1958 and 1959. All materials, plus soils 4 feet beneath the trash were removed in 1959 to construct the alert apron. A preliminary finished document was signed in September 1991 and will become final dependent on SI results.

Table 3.3-2. IRP Site Descriptions and Locations
Page 2 of 8

Site No.	Site Name/Location	Site Description
Operable Unit No. 2 (continued)		
LF-62	Landfill Northeast of Runway 24	Miscellaneous construction debris was believed deposited at this site during the 1950s. A PA/SI has yet to be conducted at this site.
LF-63	Weapons Storage Area Landfill, West of Weapons Storage Area	Industrial wastes, including heavy metals, were deposited in this small fill area during the 1940s and 1950s. A PA/SI has yet to be conducted at this site.
OT-35	Sludge Spreading Areas (2), South of Taxiway A and North of Runway 06 and Taxiway C	Between mid-1960s and 1982, waste treatment plant sludge was spread alongside the runway and taxiway. No environmental contamination has been detected. A preliminary finished document was signed in 1991 and will become final dependent on SI results.
OT-49	EOD Range, Northwest Section of the Base	Approximately 100 pounds/year of ordnance were disposed at the EOD range. The range was closed in 1991. The EOD range is being cleared of explosive ordnance. Final remediation of soil and/or groundwater contamination at the range will be determined by the results of ongoing site investigations.
SS-05	TCE Spill (Pierce's Point Plume), Southwest of Alert Apron	In 1980, TCE concentrations of 700 parts per billion were discovered in Pierce family well migrating into Van Etten Lake, volatilizing naturally. Possible source of contamination could be an old sump in the WSA, which has been removed.
SS-09	JP-4 Spill, Center of Runway	An estimated 125 gallons of JP-4 were spilled in 1978 when a KC-135 tanker lost an engine during takeoff. Foam was applied to fuel and then washed off the runway. Preliminary NFADD submitted to EPA and MDNR in 1990.
SS-10	JP-4 Spill, End of Runway 24	In 1978, a B-52 spilled 400 to 500 gallons of JP-4 on Taxiway E. Fuel spill was washed off taxiway. During soil and groundwater sampling in 1989, petroleum hydrocarbon contamination was found in only one soil sample. A preliminary finished document was signed in 1991 and will become final dependent on SI results.

Table 3.3-2. IRP Site Descriptions and Locations
Page 3 of 8

Site No.	Site Name/Location	Site Description
Operable Unit No. 2 (continued)		
SS-11	JP-4 Spill, End of Runway 06	In 1984 an unknown amount of JP-4 was spilled by an A-7 training aircraft. Fuel spill was washed off the runway. Preliminary NFADD submitted to EPA and MDNR in 1990.
SS-12	JP-4 Spill, Southwest End of Taxiway A	In 1982 a B-52 struck a snow bank, rupturing a fuel tank on one wing. The quantity of fuel spilled is unknown. Spill was washed off taxiway by rain and snow. Preliminary NFADD submitted to EPA and MDNR in 1990.
SS-51	KC-135 Crash Site, Midway on the Runway	A KC-135 crashed in October 1988 and 3,000 gallons of JP-4 either spilled or burned. A 1989 study revealed high levels of hydrocarbons in two wells and approximately 1.2 feet of fuel on the water table.
SS-55	Small Arms Range, Northwestern Part of Base	A sand backdrop contains bullet fragments consisting of lead and copper. If leachable, these two metals are possible contaminants. The base is planning soil sifting of the earthen berm.
SS-59	Aqueous Film Forming Foam Release (Building 5306)	Fire fighting foam was released during a malfunction of the fire suppression system. In 1992, the MDNR informed the base that butyl carbitol, a component of the foam, is a pollutant.
ST-44	Leaking Underground Storage Tank, Alert Facility (Building 5350)	A 20,000-gallon heating fuel tank failed a tank tightness test and was purged in October 1991; tank has been removed. Leak of product has not been confirmed. No fuel has been detected in groundwater by two monitoring wells installed at either end of the tank.
ST-61	Leaking Underground Storage Tank (Building 5306)	A 7,000-gallon JP-10 fiberglass UST located in the Weapons Storage Area ruptured in December 1992, during tank removal operations. A small amount of fuel spilled into a concrete containment vault. The fuel and some water, which had seeped into the vault, was pumped into 55-gallon drums. No fuel was believed to have escaped from the containment unit.

Table 3.3-2. IRP Site Descriptions and Locations
Page 4 of 8

Site No.	Site Name/Location	Site Description
Operable Unit No. 3		
FT-01	Inactive Fire Protection Training Area, Northeast End of Runway	Drums of waste fuels and solvents were dumped on the ground and burned between 1951 and 1958.
SD-43	Dry Well, Munitions Maintenance Squadron (Building 5044)	A dry well was connected to a floor drain from Building 5044 originally constructed as a battery shop. The well was apparently used for disposing of (presumably neutralized) battery acid. Soil samples taken in October 1991 revealed high levels of benzene, ethylbenzene, toluene, phenol, and total xylene.
SS-03	JP-4 Spill, Southwest of Building 43	JP-4 was drained from tanker trucks in 1956 or 1957. Contamination has migrated to Van Etten Lake. Arrow Street pump and treat system is currently treating groundwater. A preliminary finished document was signed in September 1991 and will become final dependent on SI results.
SS-17	Fuel Oil Spill, Near Building 25	100 gallons of heating oil was spilled in 1978; spill was not contained and was absorbed into the soil. Groundwater from this area is currently being treated by Arrow Street pump and treat system.
SS-21	TCE Spill (Arrow Street Plume), Northwest of Building 43	Leak detected in 1977 where a filler pipe joined a waste TCE storage tank. Tank and surrounding soil were removed. Groundwater under this site is currently being treated by Arrow Street pump and treat system. A preliminary finished document was signed in 1991 and will become final dependent on SI results.
SS-22	Pesticide Spill, near Building 140	Pesticide sprayer trucks were washed down and rinsate leaked into soil. Groundwater under this site is being treated by the Arrow Street pump and treat system. A preliminary finished document was signed in 1991 and will become final dependent on SI results.

Table 3.3-2. IRP Site Descriptions and Locations
Page 5 of 8

Site No.	Site Name/Location	Site Description
Operable Unit No. 3 (continued)		
SS-47	Base Gas Station	A discrepancy between the fuel manifests and the UST stick test was detected in November 1987. Testing in May of 1990 and 1991 detected no leaks. If groundwater contamination exists it will be treated by the Arrow Street pump and treat system.
SS-56	Fuel Spill, Air Force Beach	A leaking underground fuel tank and delivery system for dispensing boat gasoline was discovered in 1991. The tank was removed and replaced with an aboveground tank. A release is also suspected in an on-site portable fuel tank storage shed.
SS-57	Old Apron Hydrant System Operational Apron	In 1984 benzene was discovered in observation wells in the vicinity of a fuel hydrant system which has been inactive for over 20 years.
SS-60	Aqueous Film Forming Foam Release Operational Apron	Foam was released as routine disposal. This practice ended in 1992 after MDNR informed the base that butyl carbitol, a component of the foam, is a pollutant.
Operable Unit No. 4		
OT-24	Three Pipes Drainage Ditch Southwest of Base Family Housing and Adjacent to Base Boundary	TCE was detected in the drainage ditch in 1988. A 1990 USGS study found discharge levels to the Au Sable River above action level; source believed to be from Mission Drive plume.
SS-08	TCE and Fuel Spill, Nose Dock/Operational Apron	A 1982 study by USGS identified TCE, DCE, and benzene in groundwater; however, no major spills are known to have occurred in the area. Mission Drive pump and treat system currently treating groundwater.
SS-20	JP-4 Spill (Building 5001)	250 gallons of JP-4 were spilled inside Building 5001 in 1971; spill was contained within the building. No evidence of environmental contamination was detected. A preliminary finished document was signed in 1991 and will become final dependent on SI results.

Table 3.3-2. IRP Site Descriptions and Locations
Page 6 of 8

Site No.	Site Name/Location	Site Description
Operable Unit No. 4 (continued)		
SS-42	JP-4 Fuel Pump Spill, Aerospace Ground Equipment Shop (Building 5009)	In November 1991 a malfunctioning pump siphoned 1,500 gallons from an aboveground JP-4 fuel storage tank into the ground beneath the pump. Two monitoring wells were installed and showed floating free product. Auto-skimming equipment was installed and has recovered approximately 700 gallons of the fuel.
SS-53	Parking Spot 19, Operational Apron	A leak in a fuel line was detected in October 1988. The groundwater from this site is being treated by the Mission Drive pump and treat system.
SS-54	Aqueous Film Forming Foam Spill, Hangar 5063	Foam was dispensed during initial system testing in 1991 and hosed out of the facility. Samples of the surrounding soil indicated butyl carbitol concentrations. MDNR informed the base that butyl carbitol is a pollutant.
ST-41	Leaking Underground Storage Tank (Building 5011)	A leak was detected in a gasoline tank in May 1990. A monitoring well was installed and no free product was found. The tank was replaced with an aboveground tank.
Operable Unit No. 5		
FT-02	Active Fire Protection Training Area, Southwest Section of the Base North of Security Police Obstacle Course	Gravel burn pit utilized between 1958 and 1982. Concrete pit with oil/water separator constructed in 1982. Fire training activities are ongoing at this site.
LF-27	Miscellaneous Construction Debris Disposal, South of Taxiway A between Sewage Lagoons and Fire Training Area	6.5-acre landfill received coal ash, concrete, asphalt, and metal from 1950 to 1972. Empty drums and various metal and domestic debris were removed from the surface in 1990. Toluene, DCE, arsenic, and iron were detected in surface water samples.

Table 3.3-2. IRP Site Descriptions and Locations
Page 7 of 8

Site No.	Site Name/Location	Site Description
Operable Unit No. 5 (continued)		
OT-16	Jet Engine Test Cell (Building 5098)	Until 1987, floor drain was connected to a sump that overflowed to the tile field. Xylene, toluene, and benzene detected in groundwater in 1991.
WP-32	Aeration Lagoons (3), Southwest Portion of Base	Small amounts of waste solvents and waste oils may have entered treatment system via dumping into sewer between 1978 and 1981. Current sewage lagoon was lined in 1982.
WP-33	Seepage Lagoons (8), Southwest Portion of Base	Constructed to handle effluent from aeration lagoons. No evidence of environmental contamination has been detected.
Operable Unit No. 6		
LF-23	Domestic Waste/Auto Parts Disposal Southwest of POL Bulk Storage Area	Between 1951 and 1953, domestic waste, wood debris, auto parts, and small amounts of oils and solvents were disposed at this 0.6-acre site.
SS-06	Fuel Spill (POL Plume), POL Bulk Storage Area	A 1979 USGS study identified benzene, toluene, and organic compounds. In 1983, free floating product was discovered in groundwater.
SS-13	Gasoline Spill, Motor Pool (Building 394)	Unknown amount of motor vehicle fuel was spilled in the mid-1970s. Fire hydrants were opened to dilute the product. Frozen ground hampered attempts to excavate contaminated soil.
SS-14	JP-4 Spill, Southwest of Building 3029	Tank truck bottoms drained of JP-4 in 1956 or 1957. No contamination detected in soil and groundwater samples. Preliminary NFADD submitted to EPA and MDNR in 1990.

Table 3.3-2. IRP Site Descriptions and Locations
Page 8 of 8

Site No.	Site Name/Location	Site Description
Operable Unit No. 6 (continued)		
SS-19	JP-4 Spill, Motor Pool (Building 393)	In 1974 or 1975, approximately 500 gallons of JP-4 were spilled within Building 393; the spill was washed down the sanitary sewer system. A preliminary finished document was signed in 1991 and will become final dependent on SI results.
SS-48	Locomotive Shop (Building 3020)	A release was observed from an aboveground heating oil tank in 1988. It was not possible to remove all the soil because of its proximity to the building. Three wells were installed and samples were found to be clean.
SS-52	KC-135 Cockpit Trainer Spill, Northeast of the POL Bulk Storage Facilities	An oil stain was discovered in April 1991 that appeared to be the result of a heating oil spill. Seven drums of soil were removed, but further efforts were blocked by railroad tracks. The tracks have since been removed and further investigation is ongoing.
SS-58	1700, 1800 Military Family Housing USTs	In the vicinity of abandoned and/or removed 2,000-gallon fuel oil storage tanks. Units requiring investigation: 1750, 1752, 1754, 1756, 1758, 1760, 1820, 1822, 1824, 1826, 1828, 1830. Unit 1752 had a confirmed release from a supply line.
ST-40	Leaking Underground Storage Tank (Building 351)	A leak was detected in a waste oil tank in May 1990. The tank was removed, monitoring wells were installed, and soil boring samples were taken.
ST-46	Leaking Underground Storage Tank (Building 7297)	A diesel fuel leak was detected in May 1990. The tank was pulled and monitoring wells were installed. Free floating product was found.
WP-04	Inactive Sludge Drying Beds, Southeast Corner of the Base	Waste treatment drying beds used to dry sludge believed to have absorbed TCE prior to reaching treatment plant.

all government property transfers by deed, a covenant must also warrant that any additional remedial action found to be necessary after the date of such transfer shall be conducted by the United States.

The Air Force must complete the IRP for the contaminated sites on Wurtsmith AFB and provide the assurances required by CERCLA §120(h) for all properties disposed. The combination of these requirements may delay disposal or surrender of parcels that affect reuse.

The Air Force is committed to the identification, assessment, and remediation of the contamination from hazardous substances at Wurtsmith AFB. This commitment will assure the protection of public health as well as restoration of the environment. Additionally, the Air Force will work aggressively with the regulatory community to ensure that disposal or surrender of property occurs at the earliest reasonable date so as not to impede the economic redevelopment of the area through reuse of Wurtsmith AFB. Quantification of those delays based on the conceptual plans for all redevelopment alternatives and what is currently known at this stage of the IRP is not possible.

Closure Baseline. The closure of Wurtsmith AFB will not affect the ongoing IRP activity. These IRP activities will continue in accordance with EPA, state, and local regulatory agency regulations to protect human health and the environment, regardless of the alternative chosen for reuse. The Air Force will continue to abide by the 1980 Consent Decree with the State of Michigan.

The OL will oversee the coordination of the contractors and assure that the EPA, MDNR, and local regulatory agency concerns are addressed. The Air Force will retain necessary interests (for example, easements) in order to perform operations and maintenance on all remediation systems.

3.3.4 Storage Tanks

USTs are subject to federal regulations within RCRA, 40 CFR 280. These regulations were mandated by the Hazardous and Solid Waste Amendments of 1984. In Michigan, USTs are regulated under the Underground Storage Tank Act, Public Act 423 of 1984, as amended. The MDNR and the Fire Marshal Division of the State Police enforce the regulations set forth under this act. Additionally, leaking USTs are regulated under the Leaking Underground Storage Tank Act, Public Act 478 of 1988, as amended.

Aboveground storage tanks are regulated by the National Fire Protection Association guidelines. The Michigan Fire Marshal is authorized to enforce these guidelines under Act 207, the Michigan Fire Protection Code.

Preclosure Reference. There are currently 151 active storage tanks in place at Wurtsmith AFB, of which 53 are USTs and 98 are aboveground storage tanks. Ten inactive USTs and 25 inactive aboveground storage tanks also remain in place. Storage tanks of less than 1,000 gallons or tanks used for domestic heating fuels are not regulated by the state. Detailed lists of storage tanks are presented in Appendix G.

The Underground Storage Tank Management Plan outlines Wurtsmith AFB's program to meet federal and state laws governing the testing, upgrading, and replacement of USTs. The Air Force plans to remove all USTs not identified for reuse prior to closure. All tanks out of service over 12 months will be considered abandoned according to state law, unless they have been identified for reuse and the state has granted a waiver. All known heating oil USTs associated with base family housing units were removed during the conversion to gas heating.

The two largest aboveground bulk storage tanks hold 1,260,000 and 568,000-gallons of JP-4. These tanks were supplied by railroad tank cars and used to feed the operational apron underground hydrant system. This system is regulated by 40 CFR 60.110 Subpart K, has leak detection in-place, and undergoes an annual nonvolumetric tightness test. The fuel storage area and the hydrant system are managed by the Supply Fuels Branch.

Twenty-two oil/water separators are located throughout Wurtsmith AFB and range in size from 60 to 12,030 gallons. Oil/water separators are not regulated by the state. An inventory of these oil/water separators is provided in Appendix G.

Closure Baseline. USTs that meet state regulations may be left in place to support reuse activities. USTs that do not meet current regulations and have not been identified for reuse will be deactivated and removed prior to closure. The aboveground storage tanks will be emptied of product, purged of fumes to minimize fire hazards, and secured (safeguarded against trespassing) at base closure. These operations will be monitored by the Fire Marshal Division of the Michigan State Police. If not identified for reuse, the fuel hydrant system would be purged of product and rendered inoperable. Sections located under parking aprons or taxiways would be filled with concrete; more accessible sections would be removed. All oil/water separators will be pumped and cleaned of any contents as well as integrity tested; those found to be unfit will be closed.

3.3.5 Asbestos

Asbestos-containing building material remediation is regulated by the EPA, Occupational Safety and Health Administration (OSHA), the Michigan Department of Public Health, and the Air Quality Division of the MDNR.

Asbestos fiber emissions into ambient air are regulated in accordance with Section 112 of the Clean Air Act (CAA), which establishes the National Emissions Standards for Hazardous Air Pollutants (NESHAP). The NESHAP regulations address the demolition or renovation of buildings with asbestos-containing materials (ACM). The Toxic Substances Control Act (TSCA) and the Asbestos Hazard Emergency Response Act (AHERA) provide the regulatory basis for handling ACM in kindergarten through 12th grade school buildings. AHERA and OSHA regulations cover worker protection for employees who work around or remediate ACM.

Renovation or demolition of buildings with ACM has a potential for releasing asbestos fibers into the air. Asbestos fibers could be released due to disturbance or damage from various building materials, such as pipe and boiler insulation, acoustical ceilings, sprayed-on fire proofing, and other material used for soundproofing or insulation.

There are two primary categories that describe ACM. Friable ACM is defined as any material containing more than 1 percent asbestos (as determined using the method specified in Appendix A, Subpart F, 40 CFR 763, Section 1, polarized light microscopy) that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable ACM are those materials that contain more than 1 percent asbestos, but do not meet the rest of the criteria for friable ACM.

Preclosure Reference. The current Air Force practice is to manage or remove ACM in active facilities, and remove ACM, following regulatory requirements, prior to facility demolition. Removal of ACM occurs when there is a potential for asbestos fiber release that would affect the environment or human health. The Air Force policy concerning the management of asbestos for base closures can be found in Appendix H.

A comprehensive asbestos survey for Wurtsmith AFB was performed in September and October of 1992. ACM was found in most of the 177 buildings surveyed; the survey results, by facility, are summarized in Appendix H. Military family housing was randomly sampled and survey results were assumed to apply to all similar housing units. ACM was identified within all housing units sampled. Unsurveyed facilities may require further study.

The Asbestos Management and Operations Plan describes identification, removal, and disposal of ACM at Wurtsmith AFB. The plan also outlines responsibility assignments and procedures to provide for proper management of asbestos. The implementation of this plan is the responsibility of base CE. Bioenvironmental Engineering supports CE by conducting site surveys, bulk sampling, and air monitoring. Bioenvironmental Engineering personnel also monitor asbestos removal projects, which can be performed by the on-base asbestos abatement team or by an outside contractor.

Closure Baseline. Asbestos will be removed as necessary to protect human health. Beyond that, an analysis will be conducted to determine the cost effectiveness of removing ACM versus considering the impacts of ACM on the market value of the property, when sale of the property is planned. ACM will be removed if a building is, or is intended to be, used as a school or child-care facility. Exposed friable asbestos will be removed or remediated in accordance with applicable Air Force policy (Appendix H), health laws, regulations, and standards, if it is determined that a health hazard exists.

3.3.6 Pesticide Usage

The federal regulations that control the use of pesticides are contained within the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). Pesticide management activities are subject to federal regulations contained in 40 CFR 162, 165, 166, 170, and 171. State regulations are promulgated under Act 171, The Pesticide Control Act of 1976 (as amended). Pest management activities at Wurtsmith AFB are conducted in accordance with Air Force regulations and management recommendations, which follow FIFRA.

Preclosure Reference. The base entomologist is responsible for implementing the Pest Management Program at Wurtsmith AFB. On-base pesticide application practices are frequently inspected by the base Bioenvironmental Engineer. Additional inspections include biannual Medical Entomological and annual Environmental Compliance Assessment and Management Program reviews by ACC. An inventory of pesticides commonly used by certified applicators at Wurtsmith AFB is presented in Appendix G.

The majority of pesticides are stored at the Entomology Shop located within the Grounds Maintenance Facility Shop (Building 140); additional pesticides are stored at the entomology storage facility (Building 141). The majority of pesticides utilized on base are for grounds maintenance and basewide pest management, although household pesticides are available at the base exchange (Building 406) and the "U-Fix-It" store (Building 9421).

Pesticide usage is seasonal, with considerable amounts applied during the spring and summer. Mec Amine-D is a broadleaf herbicide utilized during the late spring and early summer. Malathion is used against mosquitos in the spring and summer; approximately 20 gallons of Malathion are applied throughout the base two to three times a week. Aerial spraying for gypsy moths occurs in late May in coordination with the U.S. Forest Service and the state. In 1991, 178 acres at Wurtsmith AFB were sprayed utilizing approximately 1 quart of Bacillus thuringiensis (BT) per acre. Pesticides are purchased locally or ordered through base supply on an as-needed basis.

Closure Baseline. At the time of closure, pesticides will continue to be utilized by the OL for pest management and grounds maintenance.

3.3.7 Polychlorinated Biphenyls

Commercial PCBs are industrial compounds produced by chlorination of biphenyls. PCBs persist in the environment, accumulate in organisms, and concentrate in the food chain. PCBs are used in electrical equipment, primarily in capacitors and transformers, because they are electrically nonconductive and stable at high temperatures.

The disposal of these compounds is regulated under the federal TSCA, which banned the manufacture and distribution of PCBs with the exception of PCBs used in enclosed systems. By federal definition, PCB equipment contains 500 parts per million (ppm) PCBs or more, whereas PCB-contaminated equipment contains PCB concentrations equal to or greater than 50 ppm but less than 500 ppm. In accordance with TSCA, EPA regulates the removal and disposal of all sources of PCBs containing 50 ppm or more; the regulations are more stringent for PCB equipment than for PCB-contaminated equipment. The State of Michigan has no specific PCB regulations, and follows federal regulations.

Preclosure Reference. The Environmental Compliance Office is responsible for the management of PCBs at Wurtsmith AFB. Currently no PCB or PCB-contaminated equipment exists on base.

Closure Baseline. There will be no federally regulated PCB or PCB-contaminated equipment on base at closure.

3.3.8 Radon

Radon is a naturally occurring, colorless and odorless radioactive gas that is produced by radioactive decay of naturally occurring uranium. Uranium decays to radium, of which radon gas is a by-product. Radon is found in high concentration in rocks containing uranium, such as granite, shale, phosphate, and pitchblende. Atmospheric radon is diluted to insignificant concentrations. Radon that is present in soil, however, can enter a building through small spaces and openings, accumulating in enclosed areas, such as basements. The cancer risk caused by exposure, through the inhalation of radon, is currently a topic of concern.

There are no federal or state standards regulating radon exposure at the present time. The EPA offers a pamphlet, "A Citizens Guide to Radon" (U.S. Environmental Protection Agency, 1992), which offers advice to persons concerned about radon in their homes. U.S. Air Force policy requires implementation of the Air Force Radon Assessment and Mitigation Program to determine levels of radon exposure of military personnel and their

dependents. The EPA has made testing recommendations for both residential structures and schools. For residential structures, using a 2- to 7-day charcoal canister test, a level between 4 and 20 picocuries per liter (pCi/l) should lead to additional screening within a few years. For levels of 20 to 200 pCi/l, additional confirmation sampling should be accomplished within a few months. If the level is in excess of 200 pCi/l, the structure should be evacuated immediately. Schools are to use a 2-day charcoal canister test; if readings are 4 to 20 pCi/l, a 9-month school year survey is required. If all readings are below 4 pCi/l, no further action is recommended. Table 3.3-3 summarizes the recommended radon surveys and action levels.

Table 3.3-3. Recommended Radon Surveys and Mitigations

Facility	EPA Action Level[a]	Recommendation
Residential	4 to 20 pCi/l	Additional screening. Expose detector for 1 year. Reduce radon levels within 3 years if confirmed high readings exist.
Residential	20 to 200 pCi/l	Perform follow-up measurements. Expose detectors for no more than 6 months.
Residential	Above 200 pCi/l	Follow-up measurements. Expose detectors for no more than 1 week. Immediately reduce radon levels.
Two-Day Weekend Measurement		
School	4 to 20 pCi/l	Confirmatory 9-month survey. Alpha track or ion chamber survey.
School	Greater than 20 pCi/l	Diagnostic survey or mitigation.

Note: Congress has set a national goal for indoor radon concentration equal to the outdoor ambient levels of 0.2 to 0.7 pCi/l.
(a) For levels below 4 pCi/l, no further action is recommended.
Source: U.S. Environmental Protection Agency, 1992.

Preclosure Reference. A radon screening survey was conducted at Wurtsmith AFB in 1988 by the base Bioenvironmental Engineering group. The survey consisted of 36 samples taken from military housing units, the child care center, billeting, and the airman's dormitories. All samples resulted in radon levels below the EPA's recommended mitigation level of 4 pCi/l; therefore, a detailed assessment survey is not needed and mitigation activities are not necessary or advised.

Closure Baseline. Radon screening sample results were all below 4 pCi/l; no further action was necessary.

3.3.9 Medical/Biohazardous Waste

Current federal regulations do not provide for regulation of medical wastes, but do allow for states to individually regulate medical wastes. The state regulates medical waste under the Michigan Medical Waste Management Act, Michigan Compiled Laws Annotated, Chapter 333 - Public Health Code Part 138.

Preclosure Reference. Wurtsmith AFB operates a 25-bed hospital that provides inpatient services such as general surgery, X-ray, and labor and delivery, as well as outpatient care. The dental clinic is incorporated within the same facility and both provide services to active military personnel and their dependents as well as military retirees and their dependents.

The hospital and dental clinic generate approximately 2,500 pounds of medical waste monthly. The waste is disposed of utilizing the on-base pathological incinerator, which is permitted by MDNR. Incinerated waste is then disposed of by DRMO. Hospital personnel dispose of expired pharmaceuticals under the Department of the Army methods (U.S. Department of the Army, 1991).

The medical radiology unit (Building 1842) processes both medical and dental X-ray film. The effluent is passed through an in-line silver recovery filter; the remaining effluent is discharged into the sanitary sewer and further treated at the WWTP.

The base photographic laboratory (Building 5065) utilizes an electrolytic silver recovery system. Recovered silver and spent photographic solutions are sent to DRMO; the final effluent is disposed into the sanitary sewer and is further treated at the WWTP.

Closure Baseline. The hospital and dental clinic will be inactive; therefore, no biohazardous waste will be generated at base closure. Existing biohazardous waste will be processed and ashes removed prior to closure in accordance with appropriate federal and state regulations.

3.3.10 Ordnance

At Wurtsmith AFB, ordnance was used on three ranges: an EOD range, a grenade range, and a small arms range. The EOD range consists of a "burn furnace" situated in the center of a 2,400-foot radius circular clearing in the northwest section of the base (see Figure 3.3-2). This facility has been in operation since the mid-1950s. The grenade range consists of a firing area approximately 1,400 feet long and 400 feet wide with a 900-foot clear zone

on all sides. The grenande range is located in a wooded area in the northwest portion of the base west of Rea Road. The small arms range is located adjacent to Rea Road in the western portion of Wurtsmith AFB and consists of an open range with firing facility and a single earthen berm which is used as a backstop.

The open area at the eastern end of the runway has been identified as a former practice bombing area. Small (17 to 25 pounds), sand-filled practice bombs were dropped at this location during the mid- to late-1920s by the 27th and 94th Fighter Squadrons of the Army Air Corps, stationed at Selfridge Field.

Transportation of all ordnance is regulated by the DOT; any ordnance remaining after disposal would be regulated under RCRA.

Preclosure Reference. Materials disposed by burning at the Wurtsmith AFB EOD range included flares, impulse cartridges, jet engine ignition cartridges, and various types of small arms ammunition up to 50 caliber. Diesel fuel was utilized as the primary ignition source. The nonreactive residue would then be placed in a burial pit and covered with soil. For disposal of items such as bomb fuses, which are destroyed by detonation using plastic explosives, a pit was excavated and then backfilled following destruction of the ordnance. Ordnance was accumulated at a holding area in the WSA, and approximately 8 pounds of ordnance was disposed of monthly.

The EOD range was closed in 1991; the grenade range was closed in 1992. Both of these areas, as well as the WSA and the former ordnance drop zone at the eastern end of the runway, were cleared of unexploded ordnance in April 1993 by the 2701st EOD Squadron from Hill AFB. Ordnance was collected and properly disposed. The earthen berm at the small arms range is scheduled for soil sifting to remove lead in the fall of 1994.

Closure Baseline. All ordnance accumulated since these ranges have been closed will be properly packaged and transported off base for utilization or disposal by other Air Force units. The EOD range, grenade range, and former ordnance drop zone have been cleared of all unexploded ordnance. The small arms range will be inspected and certified as clean prior to property disposal.

3.4 NATURAL ENVIRONMENT

This section describes the affected environment for natural resources: soils and geology, water resources, air quality, noise, biological resources, and cultural resources.

3.4.1 Soils and Geology

Soils, geology, mineral resources, and seismic issues are addressed in this section. The ROI for soils is localized and limited to Wurtsmith AFB. The ROI for geology includes the general tectonic framework that encompasses Iosco County.

3.4.1.1 Soils. A detailed soil survey has not been completed by the U.S. Department of Agriculture, Soil Conservation Service (SCS) for Iosco County or Wurtsmith AFB. The Air Force and SCS surveyed the base in 1977 and developed a general soils association map (U.S. Department of Agriculture, SCS, 1977). The Grayling Complex, which includes sand, silt, and a small amount of clay, is present throughout the base. In the undeveloped areas of the base these soils are excessively drained (U.S. Air Force, 1990b). Hydric soils have been identified in four locations on Wurtsmith AFB (Figure 3.4-1). Three of these locations have been identified as wetlands (see Section 3.4.5, Biological Resources). The distribution of soils on base is presented in Figure 3.4-1.

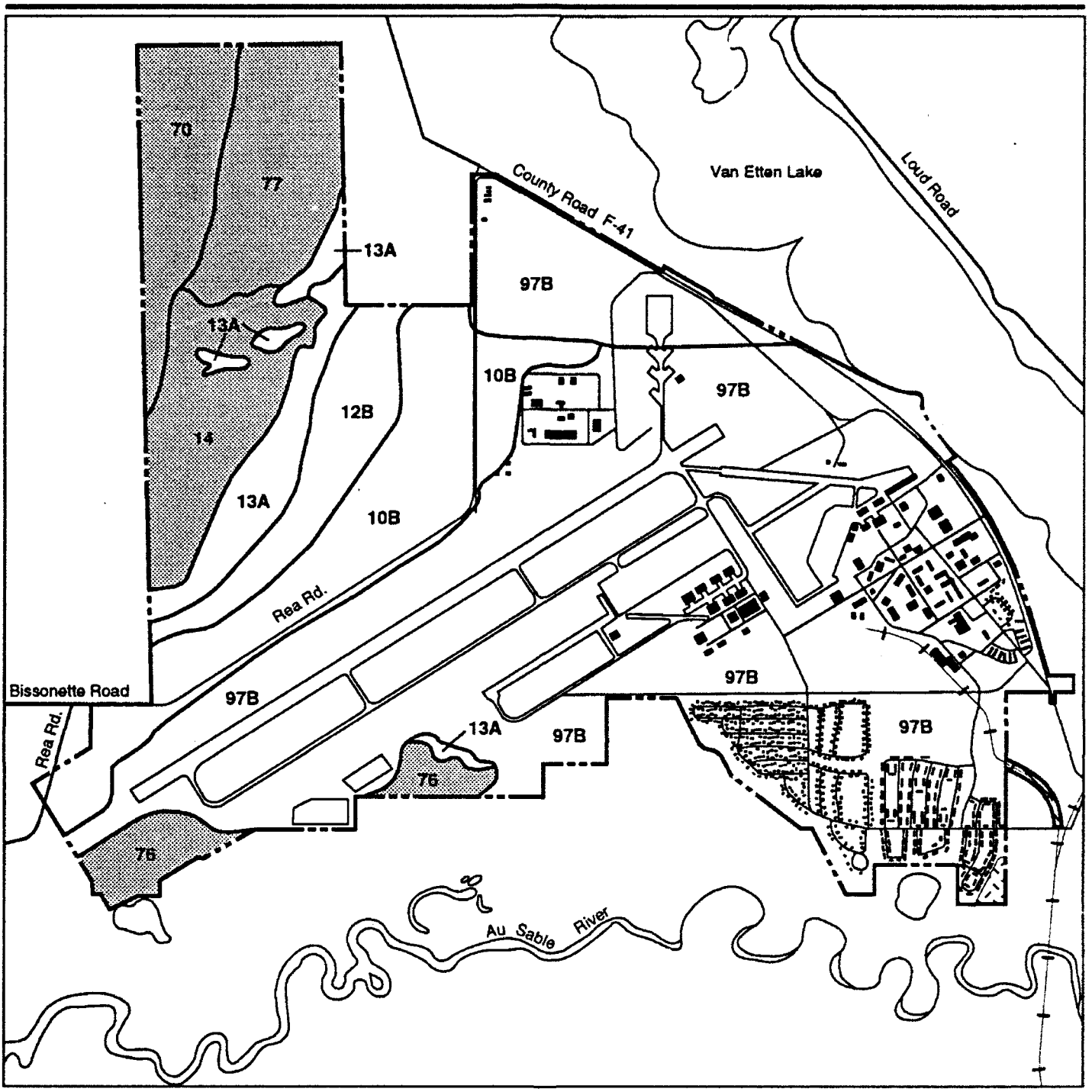
The soils result from the weathering of Quaternary glacial fluvial deposits, and minor effects of recent eolian (windblown) action. Wind erosion of unvegetated/disturbed ground in the area is a regional concern but has not been identified as a major problem for soils on and surrounding the base (U.S. Air Force, 1990b). Erosion by water is not a problem because the sandy, permeable soils on base provide adequate drainage to undeveloped land and the base is relatively flat. In addition, vegetative cover serves to stabilize the soils by impeding the flow of water.

No prime or unique farmlands are present on the base (U.S.Department of Agriculture, SCS, 1977). No areas at Wurtsmith AFB are used for field crops. The Farmland Conversion Impact Rating Form, AD-1006, is presented in Appendix L.

There are several areas on Wurtsmith AFB where soils are likely to be contaminated. These areas are being investigated under the IRP to determine the extent of contamination, if any. Descriptions and locations of these areas are presented in Section 3.3, Hazardous Materials and Hazardous Waste Management.

3.4.1.2 Physiography and Geology

Physiography. Wurtsmith AFB is located within a nearly level coastal sand plain of the Eastern Lake section of the Central Lowland Physiographic Province. The base is bounded on the east by Van Etten Lake and Van Etten Creek, and on the west by 80-foot high bluffs, which are remnants of Pleistocene deltaic deposits (U.S. Geological Survey, 1991). The 3.5-mile wide sandy plain between Lake Huron and the bluffs is part of the Oscoda



EXPLANATION

- Base Boundary
- 10B Grayling Sand
- 12B Croswell Sand
- 13A Avgres Sand
- 14 Roscommon Mucky Sand
- 70 Loxley Muck
- 76 Lupton Muck
- 77 Tawas Muck
- 97B Urban Land- Grayling Complex

Hydric Soils

0 750 1500 3000 Feet

Note: Figure 1.2-1 shows Air Force fee-owned property.

Source: U.S. Department of Agriculture SCS, 1977.

Soils Distribution

Figure 3.4-1

Lake Plain (Burgis, 1977). The terrain at Wurtsmith AFB is flat to gently rolling and is interrupted by several long, linear ridges that generally rise 5 to 10 feet above the sandy plain; the ridges are geomorphic expressions of ancient beaches and sand dunes. The elevation of the land surface ranges from 580 feet above MSL along the Lake Huron shoreline east of the base, to 730 feet above MSL at the top of the bluffs to the west of the base.

Geology. Geologic units at Wurtsmith AFB consist of unconsolidated glacial deposits and underlying bedrock. The glacial deposits, which range in thickness from approximately 100 to approximately 250 feet, consist of gravel, sand, silt, and clay deposited by glaciers in and around glacial lakes. Surficial deposits include ice-contact sediments such as till (a mixture of gravel, sand, silt, and clay); lacustrine sediments such as deltas, beaches, and lakebed sand and clay; and alluvium near drainage channels (U.S. Geological Survey, 1991). Near Van Etten Lake, in the eastern part of the base, eolian deposits are present.

Mississippian bedrock of carbonaceous shales and dolomitic limestone underlies the glacial deposits. The uppermost units in the bedrock consist of sandstones, siltstones, and shales of the Coldwater Shale and the Marshall Formation (U.S. Geological Survey, 1991). The Coldwater Shale is primarily shale with thin lenses of limestone, dolomite, sandstone, and siltstone. The Marshall Formation is a very fine- to coarse-grained sandstone containing layers of shale, sandy shale, and siltstone.

No oil and natural gas resources have been identified in the vicinity of Wurtsmith AFB (Leighton, 1993). However, because of the presence of producing fields south of Alpena County (e.g., the Saginaw and Deep River fields), some speculative leases have been acquired, and a few exploration wells have been drilled in the vicinity. None of the wells in Iosco County have produced sufficient oil/gas to be viable (Dorr and Eschman, 1970; Michigan Department of Natural Resources, 1976).

One oil and gas lease has been acquired on Air Force fee-owned land on Wurtsmith AFB; the lease is administered by the Bureau of Land Management. The lease is for approximately 260 acres in the south-central and north-central portions of the base. Because of safety considerations for flight operations at Wurtsmith AFB, all drilling into this lease area must be performed using directional drilling from areas outside of Wurtsmith AFB property. If oil and gas are not produced from the property, the lease will expire in October 1995; otherwise, the lease will be valid as long as oil and gas are being produced from the property.

The glacial deposits contain sand and gravel constituents, but no portion of these deposits has been identified as an economic source of aggregate, construction materials, or other sand or gravel resources. Generally, the State of Michigan is a major producer of sand and sandstone (Heinrich,

1979; Sundeen, 1979), and Iosco County is known to have large reserves of sand resources (Heinrich, 1979). No uranium mines/leases, Known Geothermal Resource Areas, or critical and strategic metallic/nonmetallic mineral resource mining or leasing activities occur at or near the base (U.S. Air Force, 1990b).

Wurtsmith AFB lies within a seismic risk zone classified as Seismic Zone 0 (International Conference of Building Officials, 1991). Seismic Zone 0 represents a very low potential risk for large seismic events. The maximum credible earthquake predicted for the area has a magnitude of 6.1 on the Richter Scale (U.S. Air Force, 1990b). Active faults have not been identified in the vicinity, and the area is not susceptible to liquefaction.

3.4.2 Water Resources

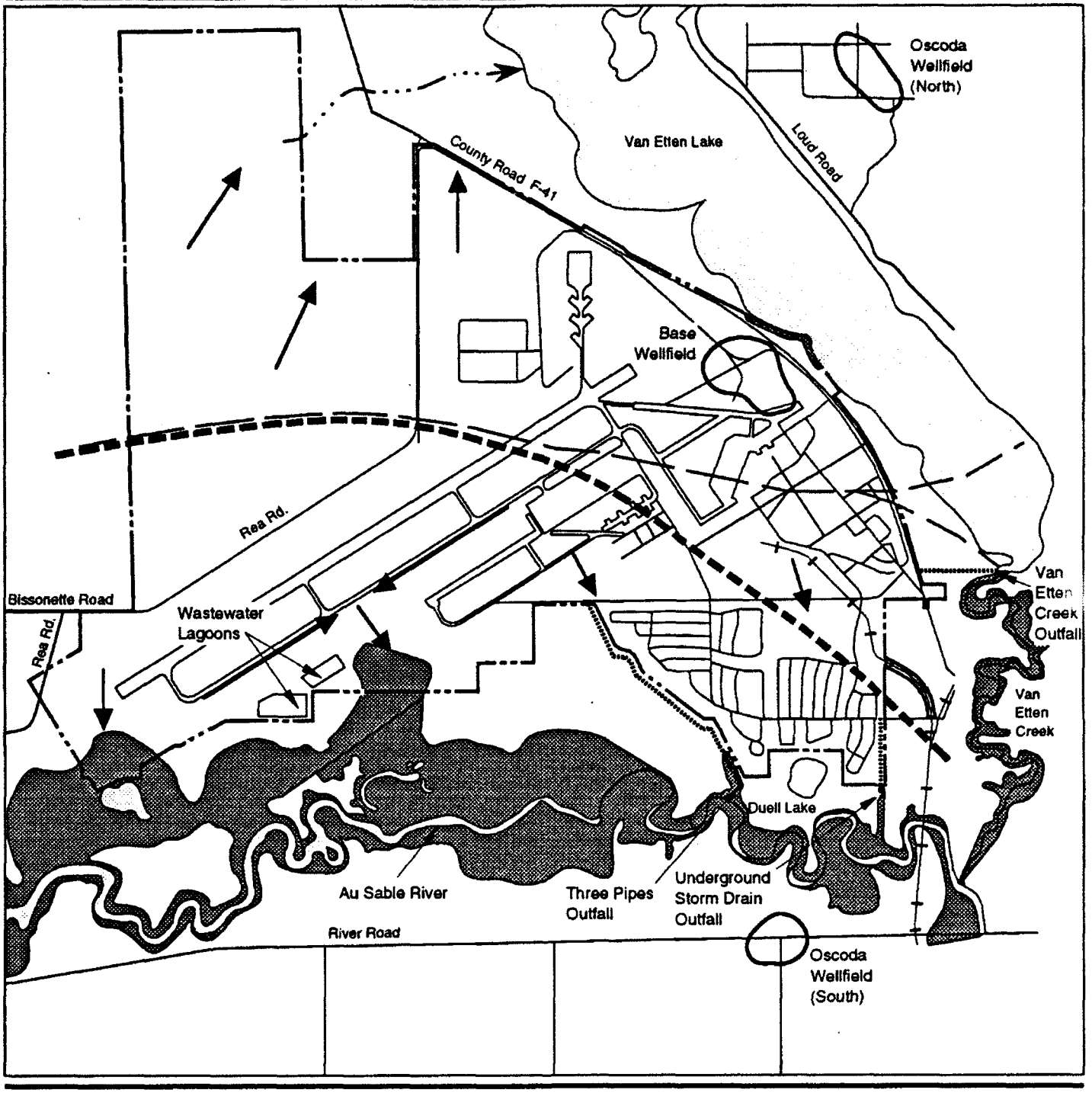
The ROI for surface water and groundwater generally extends beyond the base property to areas affected by changes in resource usage.

3.4.2.1 Surface Water. The Au Sable River is the principal river in the area of Wurtsmith AFB and flows eastward south of the base (Figure 3.4-2) to discharge into Lake Huron. Stretches of the Au Sable River west of the base have been designated as a scenic river under the federal Wild and Scenic Rivers Act of 1968 (16 U.S.C. §1,721 et seq.) and as a wild and scenic river under Act No. 231 of the Michigan Public Acts of 1970 (Michigan Compiled Laws 281.761 et seq.). Several small hydroelectric dams confine the lower Au Sable River, including Foote Dam, upstream from the base. Van Etten Creek flows along the eastern side of the base, connecting Van Etten Lake with the Au Sable River.

Van Etten Lake is a man-made lake 4 miles long and 0.5 mile wide. The Au Sable River, from its mouth to Foote Dam, Foote Dam Pond, and Van Etten Lake are considered cold-water fisheries. Lake Huron is used for public water supply and recreation. Two small lakes, Allen Lake and Duell Lake, are located just south of the base border. The recharge sources to the surface water bodies are precipitation and snowmelt.

Executive Order 11988 (Floodplain Management) governs federal actions (including disposal of property) and Air Force Regulation 19-9 (Chapter 5, Floodplain Management and Wetlands Protection) implements the Executive Order for Air Force actions. One requirement is the identification of floodplains that would be affected by an action.

The Federal Emergency Management Agency has studied and mapped 100-year floodplains in Oscoda and Au Sable townships (Federal Emergency Management Agency, 1982; 1988); however, the locations of floodplains have not been mapped onto Wurtsmith AFB. Extrapolation of the published data (U.S. Air Force, 1990a; Federal Emergency Management Agency,



EXPLANATION

- Base Boundary
- Intermittent Stream or Ditch
- Local Groundwater Divide
- Drainage Ditch
- Overland Surface Drainage Direction
- Surface Water Divide
- 100-Year Floodplain

Source: Modified from FEMA, 1982, 1988; U.S. Air Force, 1990a; 1990b.

Notes: a. Van Etten Lake floodplain shown only in vicinity of Wurtsmith AFB.
b. Figure 1.2-1 shows Air Force fee-owned property.

0 850 1700 3400 Feet

Hydrology

Figure 3.4-2

1982, 1988; U.S. Geological Survey, 1988a, 1988b) onto Wurtsmith AFB identifies on-base floodplains along the Au Sable River and adjacent to Van Etten Lake (see Figure 3.4-2).

Some of the floodplain area is fee-owned by the Air Force, some is permitted land from the U.S. Forest Service, and some is leased. In addition, some of the off-base easements fall within the 100-year floodplain.

Surface Water Quality. No water quality standards violations have been recorded for Van Etten Creek or Foote Dam Pond (U.S. Air Force, 1990b). Surface water quality in the area is generally excellent and appears to support current uses (U.S. Air Force, 1990b).

3.4.2.2 Wetlands. Wetland areas are located in the forest in the northwestern part of the base and along the southwest border of the base. Wetlands are protected under federal and state regulations because of their ecological value. Wetlands on base are discussed in Section 3.4.5.4, Sensitive Habitats.

3.4.2.3 Surface Drainage. General drainage patterns and discharge points are shown in Figure 3.4-2. The sandy, permeable soils throughout Wurtsmith AFB generally provide adequate drainage (U.S. Air Force, 1990b). The storm water collection systems consist of open drainage courses and underground storm drains that carry water to two ditches, which convey the water to the Au Sable River. Another underground storm drain network discharges water to Van Etten Creek. Seepage ponds and three aerated ponds are located along the southern border of the base (see Figure 3.4-2). The permeable soils and storm water collection systems at Wurtsmith AFB provide adequate drainage.

Effluent from two groundwater treatment systems and storm water runoff discharges to the local surface waters of Van Etten Creek and the Au Sable River via storm sewer networks (see Figure 3.4-2). The discharge is permitted under the NPDES, and effluent is in compliance with permit requirements.

Oscoda Township discharged 0.22 MGD of treated wastewater into the Au Sable River in 1987 (U.S. Air Force, 1990b).

3.4.2.4 Groundwater. The principal groundwater aquifer in the region extends from the ground surface to a depth of approximately 65 feet. The unconfined aquifer consists of a medium to coarse sand containing some gravels. A bed of relatively impermeable clay lies below the aquifer. Fluctuations in the water table level (1 to 3 feet) reflect changes in groundwater storage, which is controlled by precipitation and snowmelt, groundwater withdrawals, and the levels of nearby streams, lakes, and swamps. Natural discharge from the aquifer is to the Au Sable River, Van

Etten Lake, and Van Etten Creek, and ultimately to Lake Huron. Recharge to the groundwater and aquifer is directly from rainfall, snowmelt, and infiltration. Groundwater flow from the highlands west of the bluffs recharges the sand and gravel aquifer at the west edge of the base.

A groundwater divide extends diagonally from the northwestern to the southeastern part of the base. South of the divide, groundwater flows toward the Au Sable River; north of the divide, groundwater flows toward Van Etten Creek and Van Etten Lake as shown in Figure 3.4-2. The depth to water in on-base wells ranges from 5 to 20 feet below land surface. The water table rises slightly along the western margin of the base when groundwater recharge west of the base exceeds recharge from rainfall on the base (Stark et al., 1983). In the eastern part of the base, water supply and groundwater pump and treat well withdrawals lower the water table locally (U.S. Geological Survey, 1991).

As described in Section 3.2.4.1, the Township of Oscoda currently draws water from the shallow aquifer, using two wells east of Van Etten Lake, and five wells south of the Au Sable River along River Road. These wells are subject to requirements of the state program to identify and manage wellhead protection areas, a program established to protect groundwater quality under the Clean Water Act. In Michigan, communities voluntarily participate in the program by using state guidelines to develop measures that would ensure a clean drinking water supply. Oscoda Township has not developed wellhead protection areas, and currently is not actively pursuing these programs. However, the township has enacted ordinances to reduce potential impacts to wells; the primary restriction is that all buildings must be constructed with at least a 200-foot setback from each well.

Groundwater Quality. In 1990, Wurtsmith AFB discharged 0.5 MGD of wastewater from seepage beds into the principal groundwater aquifer in the region (U.S. Air Force, 1990b). The infiltrated wastewater flows a short distance before discharging to the Au Sable River and does not affect any existing water supply wells (U.S. Air Force, 1990a).

The highly permeable sand and gravel aquifer is extremely susceptible to contamination from surface chemical spills and leaking storage tanks (U.S. Air Force, 1990a). Groundwater underlying some areas of the base contains moderate to high levels of TCE, DCE, and benzene. Descriptions and locations of these areas are found in Section 3.3, Hazardous Materials and Hazardous Waste Management. In the past, several water supply wells have been closed because of contaminated groundwater. Pump and treat systems have been installed to remove and treat some of the contaminated groundwater and prevent its migration off base or into adjacent base supply wells. Currently, water in good quantity and quality is provided from the base potable water system (U.S. Air Force, 1990a).

The sewage lagoons on base have been operating on an expired discharge permit since 1988 (see Section 3.2.4.2, Wastewater). Results of the monthly shallow groundwater sampling and analyses indicate that nitrogen levels exceed the acceptable level of 5 milligrams per liter. The groundwater containing high levels of nitrogen could eventually migrate to the Au Sable River. The new permit application (in progress) will include a request for a variance of effluent limitations. The state is expected to issue a Groundwater Discharge Permit for the sewage lagoons that will be valid through base closure. An NPDES permit is not required because there is no discharge to surface water.

The water supplies on base and in the surrounding areas are discussed in Section 3.2.4.1, Water Supply. The migration of contaminated groundwater plumes may result in the closure of additional on-base wells. On-base wells are presently sampled monthly, both at the wells and at the taps. The Michigan Department of Public Health has indicated that these wells can provide an adequate water supply in the short term, but that alternate long-term water sources will have to be identified. The communities surrounding Wurtsmith AFB are currently considering several water supply alternatives, including a regional water system supplied from Lake Huron or installation of additional groundwater wells to meet long-term water supply needs.

3.4.3 Air Quality

Air quality in a given location is described as the concentration of various pollutants in the atmosphere, generally expressed in units of ppm or micrograms per cubic meter ($\mu g/m^3$). Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The significance of a pollutant concentration is determined by comparing it to federal, state, and local ambient air quality standards. These standards represent the maximum allowable atmospheric concentrations that may occur and still protect public health and welfare, with a reasonable margin of safety. The federal standards are established by the EPA and termed the National Ambient Air Quality Standards (NAAQS). Michigan has adopted federal standards as Michigan Ambient Air Quality Standards (MAAQS). The NAAQS and MAAQS are presented in Table 3.4-1.

The main pollutants considered in this EIS are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), SO_2, and particulate matter equal to or less than 10 microns in diameter (PM_{10}). The previous NAAQS for particulate matter was based upon total suspended particulate (TSP) levels; it was replaced in 1987 by an ambient standard based only on the PM_{10} fraction. Lead is not addressed in this EIS because there are no known lead emission sources in the region. Lead concentrations are monitored in a number of high population density areas elsewhere in the state and all sites meet the quarterly primary and secondary standard of 1.5 $\mu g/m^3$.

Table 3.4-1. National and Michigan Ambient Air Quality Standards[a]

Pollutants	Averaging Time	Primary[b,c]	Secondary[b,d]
Ozone	1-hour	0.12 ppm (235 $\mu g/m^3$)	Same as primary standard
Carbon monoxide	8-hour	9 ppm (10 mg/m^3)	-
	1-hour	35 ppm (40 mg/m^3)	-
Nitrogen dioxide	Annual average	0.053 ppm (100/$\mu g/m^3$)	Same as primary standard
Sulfur dioxide	Annual average	0.03 ppm (80 $\mu g/m^3$)	-
	24-hour	0.14 ppm (365 $\mu g/m^3$)	-
	3-hour	-	1,300 $\mu g/m^3$ (0.5 ppm)
PM_{10}	Annual 24-hour	50 $\mu g/m^3$ 150 $\mu g/m^3$	Same as primary standard
Lead	Quarterly	1.5 $\mu g/m^3$	Same as primary standard

Notes:
(a) National standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year, with maximum hourly average concentrations above the standard, is equal to or less than 1.
(b) Concentration expressed first in units in which it was promulgated. Equivalent units given in parenthesis are based on a reference temperature of 25°C and a reference pressure of 760 millimeters of mercury. All measurements of air quality are to be corrected to a reference temperature of 25° C and a reference pressure of 760 millimeters of mercury (1,013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
(c) National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
(d) National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

Source: Clean Air Act, Title U.S.C. 7401 et seq.

The existing air quality of the affected environment is defined by air quality data and emissions information. Air quality data are obtained by examining records from air quality monitoring stations maintained by the Air Quality Division of the MDNR. Information on pollutant concentrations measured for short-term (24 hours or less) and long-term (annual) averaging periods is extracted from the monitoring station data in order to characterize the existing air quality background of the area. Emission inventory information for the affected environment was obtained from the MDNR, EPA, and Wurtsmith AFB. Inventory data are separated by pollutant and reported in tons per day in order to describe pollutant emissions in the area.

Identifying the ROI for an air quality assessment requires knowledge of the pollutant types, source emission rates and release parameters, the proximity relationships of project emission sources to other emission sources, and local and regional meteorological conditions. For all pollutants other than ozone and its precursors, the ROI is generally limited to an area extending a few miles downwind from the source.

Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants or precursors. Ozone precursors are mainly reactive organic gases (ROG), in the form of hydrocarbons, and nitrogen oxides (NO_x). ROG are a subset of the groups of volatile organic compounds (VOC), which are compounds containing carbon, excluding CO, carbonic acid, metallic carbides, metallic carbonates, and ammonium carbonate. ROGs are gaseous forms of VOCs and do not include methane or other nonreactive methane and ethane derivatives. NO_x is the designation given to the groups of all oxygenated nitrogen species, including nitric oxide (NO), nitrogen dioxide (NO_2), nitrous oxide (N_2O), nitric anhydride (N_2O_6), and nitrous anhydride (N_2O_3).

The ROI for ozone may extend much farther downwind than the ROI for inert pollutants. In the presence of solar radiation, the maximum effect of precursor emissions on ozone levels usually occurs several hours after they are emitted and, therefore, many miles from the source. Ozone and its precursors transported from other regions can also combine with local emissions to produce high local ozone concentrations. Ozone concentrations are generally the highest during the summer months and coincide with periods of maximum solar radiation. Maximum ozone concentrations tend to be regionally distributed, because precursor emissions are homogeneously dispersed in the atmosphere.

For the purpose of air quality analysis, the ROI for emissions of ozone precursors from project construction or operational activities would be the existing airshed surrounding Wurtsmith AFB, i.e., Iosco County and portions of Alcona County, including portions of Huron National Forest. The ROI for emissions of other pollutants (CO, SO_2, and PM_{10}) is limited to the more immediate area surrounding the base.

The CAA, as amended in August 1977 and November 1990, dictates that project emission sources must comply with the air quality standards and regulations that have been established by federal, state, and county regulatory agencies. These standards and regulations focus on (1) the maximum allowable ambient pollutant concentrations resulting from project emissions, both separately and combined with other surrounding sources, and (2) the maximum allowable emissions from the project.

3.4.3.1 Regional Air Quality. Wurtsmith AFB is located close enough to Lake Huron that local weather conditions and air quality dispersion patterns

can be influenced, at times, by lake breezes. During the summer months, when temperatures and solar radiation levels are higher, ozone and its precursors, transported from other (nonattainment) regions to the south, could produce locally elevated ozone concentrations.

According to the EPA guidelines, an area with air quality better than the NAAQS is designated as being in attainment; areas with worse air quality are classified as nonattainment areas. A nonattainment designation is given to a region if the primary NAAQS for any criteria pollutant is exceeded. Pollutants in an area may be designated as unclassified when there is a lack of data for the EPA to form a basis of attainment status.

Wurtsmith AFB is located in an area that is unclassified and assumed by the EPA and MDNR to be in attainment for all federal and state criteria pollutants (Michigan Department of Natural Resources, 1991a). The closest air quality monitoring station is in Hillman, Montmorency County, approximately 50 miles northwest of the base. A Prevention of Significant Deterioration (PSD) air monitoring site was established in May 1989 for LFC Power Systems in Hillman. The facility operated two PM_{10} monitors and meteorological equipment for 1 year. Average annual reported levels of PM_{10} were 18 and 11 $\mu g/m^3$ for the 1989 and the 1990 portions of the monitoring period, respectively (Michigan Department of Natural Resources, 1991a). Three MDNR-operated PM_{10} monitoring stations in Bay County, approximately 75 miles southwest of the base, averaged 26 $\mu g/m^3$ (of PM_{10}) for the 1990 reporting year (Schroeder, 1992; Toland, 1992). These levels are well below the NAAQS and MAAQS.

Wurtsmith AFB is in Michigan's Air Quality Region II, which includes all of the upper part of the Lower Peninsula. Region I includes the Upper Peninsula and Region III the lower part of the Lower Peninsula. Region III contains two moderate ozone nonattainment areas and one serious ozone nonattainment area; the remainder of Region III is unclassified but assumed to be nonattainment for ozone. Except for ozone in Region III, the entire state is in attainment or unclassified and assumed to be in attainment for all criteria pollutants.

Michigan is currently rewriting its State Implementation Plan (SIP) to meet the requirements of the federal CAA Amendments of 1990. The SIP is developed for those areas of the state that are not in attainment of criteria pollutant standards.

Preclosure Reference. Monitoring for air quality data has not been conducted in the Wurtsmith AFB area. Because of its isolated location and rural, forested surroundings, as well as the absence of large point sources, the existing air quality around the base is good.

Based on the attainment classification, major new or modified stationary sources in the area of Wurtsmith AFB are subject to PSD review to ensure that these sources are constructed without significant adverse deterioration of the clean air in the area. Emissions from any new or modified source must be controlled using best available control technology. The air quality impacts in combination with other PSD sources in the area must not exceed the maximum allowable incremental increases identified in Table 3.4-2. Certain national parks and wilderness areas are designated as Class I areas, where any appreciable deterioration in air quality is considered significant. Class II areas are those where moderate, well-controlled industrial growth could be permitted. Class III areas allow for greater industrial development. No PSD Class I areas have been identified within 50 miles of the base. All of the surrounding area is designated by the EPA as Class II.

Table 3.4-2. Maximum Allowable Pollutant Concentration Increases under PSD Regulations

		Maximum Allowable Increment ($\mu g/m^3$)		
Pollutant	Averaging Time	Class I	Class II	Class III
TSP	Annual	5	19	37
	24-Hour	10	37	75
Sulfur dioxide	Annual	2	20	40
	24-Hour	5	91	182
	3-Hour	25	512	700
Nitrogen dioxide	Annual	2.5	25	50

Notes: Class I areas are regions in which the air quality is intended to be kept pristine, such as national parks and wilderness areas. All other lands are initially designated Class II. Individual states have the authority to redesignate Class II lands to Class III to allow for maximum industrial use.

Source: 40 CFR 52.21.

Closure Baseline. It can be reasonably assumed that pollutant concentrations at base closure would be similar to, or somewhat less than, concentrations experienced under preclosure conditions. This is because numerous emission sources would be eliminated by closure of the base (e.g., aircraft operations and aerospace ground activity). The closure would also reduce the number of motor vehicles operating in the surrounding area. Emissions associated with vehicles assigned to the base, military and commuting civilian employees, retirees visiting Wurtsmith AFB facilities, and truck traffic associated with base operations would be eliminated, with the exception of activities associated with the OL.

3.4.3.2 Air Pollutant Emission Sources

Preclosure Reference. Emission inventories for Wurtsmith AFB and Iosco County are presented in Table 3.4-3. The air quality emissions inventory for Iosco County represents 1987 data extracted from the EPA National Emission Data System. The data represent the four most important air emission source categories: fuel combustion in stationary sources, industrial processes, solid waste disposal, and transportation (mobile sources), as well as a fifth source category, miscellaneous. Stationary fuel combustion sources include both area sources and point sources of fuel used for heat and power in residences, industries, institutions, and commercial buildings. Emissions from industrial processes include only those industrial air pollutants emitted during the manufacturing process. Solid waste disposal emissions include those from all sources of open burning and incineration. Transportation emissions data distinguish between land-based (automobiles, trucks, buses, trains) mobile sources and air/water-based sources (aircraft, ships, boats). Miscellaneous emission types vary according to the region involved, but most commonly include fugitive dust, solvent evaporation, agricultural burning, forest fires, and structural fires. The inventory data indicate that CO and NO_x emissions in Iosco County derive primarily from land-based transportation-related sources.

The emission inventory for Wurtsmith AFB is representative of preclosure conditions in 1990. The primary emission sources at the base include aircraft flying operations, aircraft ground operations, aerospace ground equipment, motor vehicles, fire training exercises, boilers, furnaces, and incinerators. The largest air pollutant source for the base is aircraft flying operations, which account for 1 percent of particulate emissions in the county, 17 percent of sulfur oxide (as SO_2) emissions, 13 percent of CO emissions, 27 percent of ROG emissions, and 14 percent of NO_x (as NO) emissions.

Wurtsmith AFB has seven air emission permits issued by MDNR and one permit pending. Three of these permits allow Wurtsmith AFB to emit ROGs to the atmosphere after they have been removed from the contaminated groundwater treatment systems. Another permit allows OHM Remediation Services to operate a soil remediation project. A fifth air use permit is for the central heating plant, which provides high temperature hot water for heating the base cantonment. The permit authorizes emissions from the plant's boilers regardless of whether they are operating on natural gas, the primary fuel, or No. 2 fuel oil, the plant's alternate fuel source. The oil-fired burners contribute approximately 30 percent of the sulfur oxide (SO_x) emissions in the county. A sixth air use permit authorizes the base hospital to operate the incinerator to burn pathological waste. A seventh air permit allows Wurtsmith AFB to operate a transportation paint booth. One permit concerning a jet engine test cell is pending approval from MDNR.

Table 3.4-3. Iosco County Air Emission Inventory (tons per year)

Emission Source	TSP[a]	PM_{10}	SO_x	NO_x	ROG	CO
Iosco County[b]						
Fuel combustion	634		74	116	1,372	3,893
Industrial process	0		0	0	918	0
Solid waste disposal	25		4	7	46	139
Air/water transportation	0		3	17	360	1,345
Land transportation	447		83	1,106	841	5,066
Miscellaneous	959		0	0	0	0
Subtotal (excluding Wurtsmith AFB)	2,065		164	1,246	3,537	10,443
Wurtsmith AFB[c]						
Aircraft flying operations		16	33	219	1,395	1,634
Aircraft ground operations		0.4	0.3	3	7	9
Aerospace ground equipment		3	0.6	46	4	32
Motor vehicles (military and civilian)		0.3	0.2	2	2	13
Hospital incinerator		0.04	0.02	0.02	0.02	0.06
Heating and power production		0.02	0.001	2.3	0.02	0.04
Fire training exercises		5	0.02	0.2	12	21
Surface coatings and solvents		0	0	0	24	0
Fuel storage and transfer		0	0	0	195	0
Base Total		25	34	273	1,639	1,709
County Total	-	-	198	1,519	5,176	12,152

Notes: (a) PM_{10} data were not available at the time of this inventory.
(b) Source: U.S. Environmental Protection Agency, 1988.
(c) Source: U.S. Air Force, 1990b.

Closure Baseline. Although emissions projections for Iosco County were not available, these emissions are not expected to change significantly from the 1987 inventory information (Table 3.4-3). Closure baseline emissions resulting from OL activities at Wurtsmith AFB, as described in Chapter 2, are presented in Table 3.4-4. The closure emission inventory for the base was estimated by assuming that all emissions other than those associated with heating and power production and groundwater treatment would be eliminated. The central heating plant and power generators were assumed to operate at 20 percent of the preclosure demand in order to fulfill minimum building heating and power requirements. Emissions from motor vehicles and surface coating are assumed to be negligible compared to preclosure

Table 3.4-4. Wurtsmith AFB Closure Emission Inventory (tons per year)

Source	PM_{10}	SO_x	NO_x	ROG	CO
Wurtsmith AFB	0.004	0.0003	0.05	0.004	0.009

levels. Emissions from the groundwater treatment systems will continue at the same level as under preclosure conditions.

3.4.4 Noise

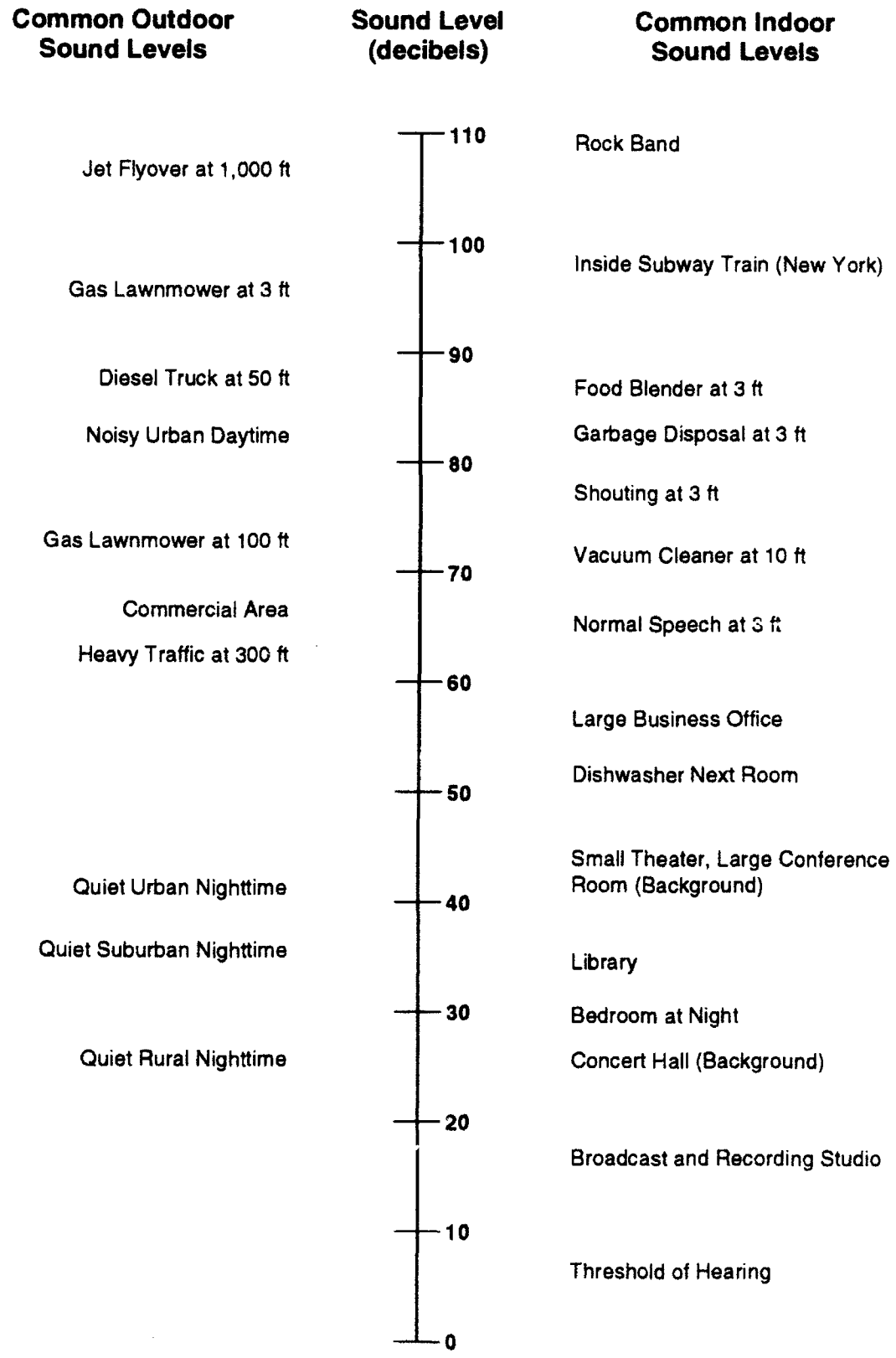
The ROI for noise sources at Wurtsmith AFB is defined using FAA-developed land use compatibility criteria. The area most affected by noise due to the base disposal and reuse is limited to the base property itself and areas along major roadways leading to the base.

The characteristics of sound include parameters such as amplitude, frequency, and duration. Sound can vary over an extremely large range of amplitudes. The dB, a logarithmic unit that accounts for the large variations in amplitude, is the accepted standard unit for the measurement of sound. Table 3.4-5 presents examples of typical sound levels. Different sounds may have different frequency contents. When measuring sound to determine its effects on a human population, A-weighted sound levels are typically used to account for the response of the human ear. A-weighted sound levels represent the sound measurement adjusted for the human sensitivity to audio frequencies between 1,000 and 8,000 cycles per second (American National Standards Institute, 1983).

Noise is usually defined as sound that is undesirable because it interferes with speech communication and hearing, is intense enough to damage hearing, or is otherwise annoying. Noise levels often change with time; therefore, to compare levels over different time periods, several descriptors were developed that take into account this time-varying nature. These descriptors are used to assess and correlate the various effects of noise on man and animals, including land-use compatibility, sleep disturbance, annoyance, hearing loss, speech interference, and startle effects.

The DNL was developed to evaluate the total community noise environment. DNL, sometimes abbreviated as L_{dn}, is the average A-weighted acoustical energy during a 24-hour period with a 10 dB adjustment added to the nighttime levels (between 10 p.m. and 7 a.m.). This adjustment is an effort to account for the increased sensitivity to nighttime noise events. DNL was endorsed by the EPA for use by federal agencies and has been adopted by HUD, FAA, and DOD.

Table 3.4-5. Comparative Sound Levels



DNL is an accepted unit for quantifying human annoyance to general environmental noise, which includes aircraft noise. The Federal Interagency Committee on Urban Noise developed land-use compatibility guidelines for noise in terms of DNL (U.S. Department of Transportation, 1980). Table 3.4-6 provides FAA-recommended DNL ranges for various land use categories based upon the committee's guidelines. The FAA guidelines were used in this study to determine noise impacts.

DNL is used in this report because it is the noise descriptor recognized by the FAA and Air Force for airfield environments. DNL is sometimes supplemented with other metrics, primarily the equivalent sound level (L_{eq}). The L_{eq} is the equivalent, steady-state level that would contain the same acoustical energy as the time-varying level during the same time interval. Occasionally, the Sound Exposure Level (SEL) is used to supplement DNL, especially where sleep disturbance is a concern. The SEL value represents the A-weighted sound level integrated over the entire duration of the noise event and referenced to a duration of 1 second. When an event lasts longer than 1 second, the SEL value will be higher than the highest sound level during the event. SEL is used in this report when discussing sleep disturbance effects.

Appendix J provides additional information about the measurement and prediction of noise. This appendix also provides more information on the units used in describing noise, as well as information about the effects of noise such as annoyance, sleep interference, speech interference, health effects, and effects on animals.

3.4.4.1 Existing Noise Levels. Typical noise sources in and around airfields usually include aircraft, surface traffic, and other human activities. Military (and civilian) aircraft operations and surface traffic on local streets and highways are the existing primary sources of noise in the vicinity of Wurtsmith AFB. In airport analyses, areas with DNL above 65 dB are often considered in land-use compatibility planning and impact assessment; therefore, the contours of DNL greater than 65 dB are of particular interest. Contours above DNL 65 dB are modeled and presented in 5 dB intervals.

Preclosure Reference. Aircraft noise at Wurtsmith AFB occurs during aircraft engine warmup, maintenance and testing, taxiings, takeoffs, approaches, and landings. Noise contours for preclosure aircraft operations were modeled using information on aircraft types; runway use; runup locations; takeoff and landing flight tracks; aircraft altitude, speeds, and engine power settings; and number of daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) operations. The noise contours for 1990 (Figure 3.4-3) were generated using the FAA-approved model NOISEMAP, version 5.2. Only those contours equal to or greater than DNL 65 dB are shown.

Table 3.4-6. Land Use Compatibility with Yearly Day-Night Average Sound Levels
Page 1 of 2

Land Use	Yearly Day-Night Average Sound Level (DNL) in Decibels					
	Below 65	65-70	70-75	75-80	80-85	Over 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(a)	N(a)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(a)	N(a)	N(a)	N	N
Public Use						
Schools	Y	N(a)	N(a)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(b)	Y(c)	Y(d)	Y(d)
Parking	Y	Y	Y(b)	Y(c)	Y(d)	N
Commercial Use						
Offices, business, and professional	Y	Y	25	30	N	N
Wholesale and retail--building materials, hardware, and farm equipment	Y	Y	Y(b)	Y(c)	Y(d)	N
Retail trade--general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(b)	Y(c)	Y(d)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y(b)	Y(c)	Y(d)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(f)	Y(g)	Y(h)	Y(h)	Y(h)
Livestock farming and breeding	Y	Y(f)	Y(g)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(e)	Y(e)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, and camps	Y	Y	Y	N	N	N
Golf courses, riding stables, and water recreation	Y	Y	25	30	N	N

Letters in parentheses refer to notes (see next page). The designations contained in this table do not constitute a federal determination that any use of land covered by the program is acceptable or unacceptable under federal, state, or local law. The responsibility for determining the acceptable and permissible land uses and the relationship between specific properties and specific noise contours rests with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving noise compatible land uses.

Key

Y (Yes)	Land use and related structures compatible without restrictions.
N (No)	Land use and related structures are not compatible and should be prohibited.
25, 30, or 35	Land use and related structures generally compatible; measures to achieve Noise Level Reduction (NLR) of 25, 30, or 35 dB must be incorporated into design and construction of structure.

Table 3.4-6. Land Use Compatibility with Yearly Day-Night Average Sound Levels
Page 2 of 2

Notes

(a) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year round. However, the use of NLR criteria will not eliminate outdoor noise problems.

(b) Measures to achieve an NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas or where the normal noise level is low.

(c) Measures to achieve an NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

(d) Measures to achieve an NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.

(e) Land use compatible, provided special sound reinforcement systems are installed.

(f) Residential buildings require an NLR of 25.

(g) Residential buildings require an NLR of 30.

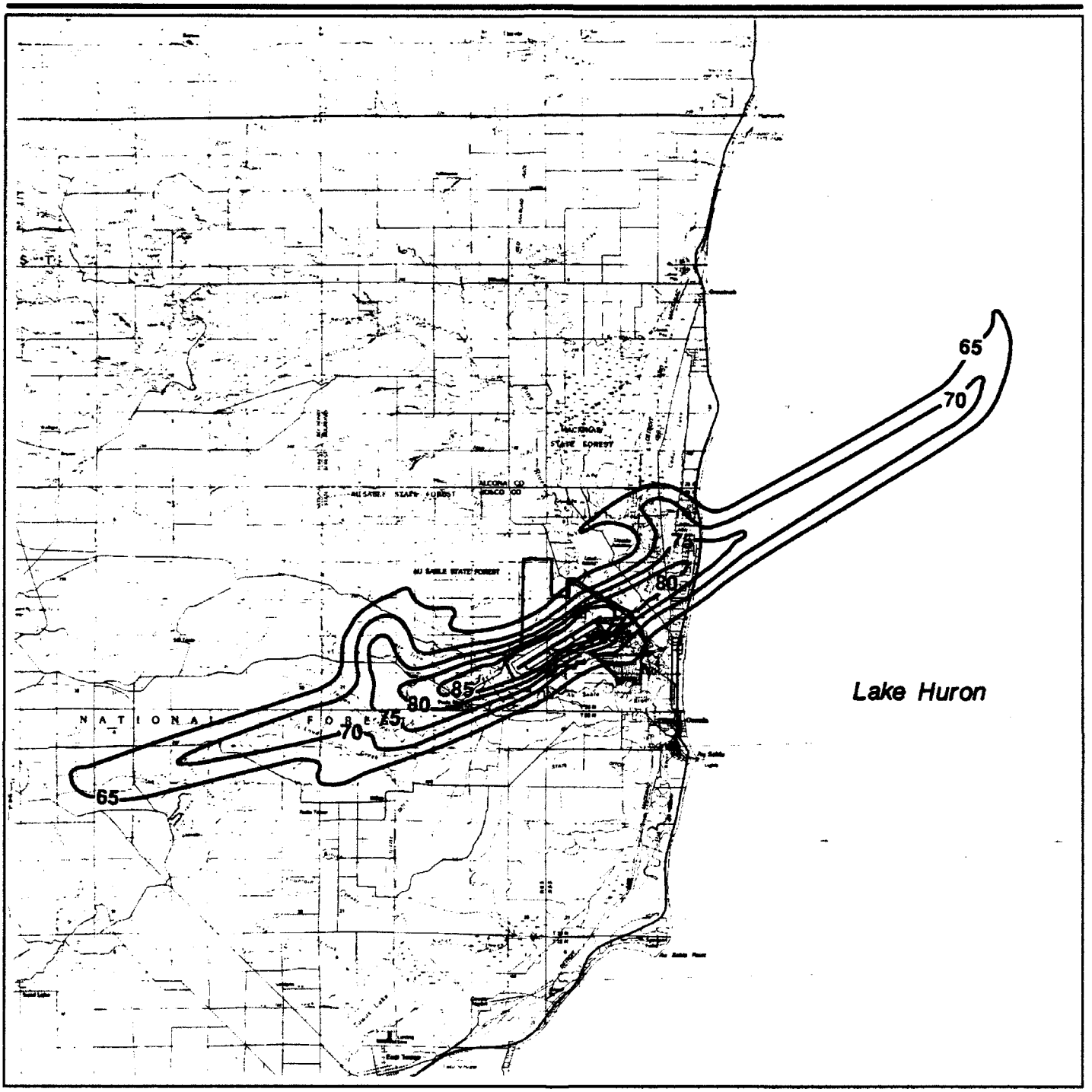
(h) Residential buildings not permitted.

Source: Derived from FAR Part 150 Airport Noise Compatibility Planning (FAA, 1989b).

Surface vehicle traffic noise levels for roadways in the vicinity of Wurtsmith AFB were estimated using the Federal Highway Administration's (FHWA's) Highway Noise Model (1978). This model incorporates vehicle mix, traffic volume projections, and speed to generate DNL. The noise levels are then presented as a function of distance from the centerline of the nearest road. The results of the modeling for surface traffic are presented in Table 3.4-7. The actual distances to the DNLs may be less than those presented in the table because the screening effects of intervening buildings, terrain, and walls were not accounted for in the modeling.

Table 3.4-7 presents noise levels due to traffic during the July peak month (refer to Section 3.2.3, Transportation). Noise levels based on the average daily traffic would be lower. The peak month noise levels were estimated based on posted speed limits; however, as traffic volumes increase, LOS and speed may be reduced, which would result in lower noise levels than those indicated in Table 3.4-7.

Appendix J contains the data used in the surface traffic analysis. These data include daily traffic volumes, traffic mix, and speeds.



EXPLANATION

DNL Noise Contours
(in 5 dB intervals)

Preclosure Aircraft Noise Contours

0 1 2 4 Miles

Map Sources: U.S. Geological Survey, 1983, 1984.

Figure 3.4-3

Table 3.4-7. Distance to DNL from Roadway Centerline for the Preclosure Reference and Closure Baseline

Roadway Segment	Distance (ft)											
	Preclosure						Closure					
	DNL 65	No. of Residents	DNL 70	No. of Residents	DNL 75	No. of Residents	DNL 65	No. of Residents	DNL 70	No. of Residents	DNL 75	No. of Residents
U.S. 23, Johnson Rd. to River Rd.	90	22	40	0	20	0	70	9	40	0	20	0
U.S. 23, River Rd. to Cedar Lake Rd.	110	0	50	0	30	0	90	0	40	0	30	0
U.S. 23, Cedar Lake Rd. to F-41	255	199	120	56	60	0	180	122	90	23	40	0
U.S. 23, F-41 to Roadside Park	150	482	70	67	30	0	130	378	60	16	30	0
U.S. 23, Roadside Park to north County line	100	174	50	0	20	0	90	134	40	0	20	0
F-41, U.S. 23 to Skeel Ave.	90	3	40	0	30	0	50	0	30	0	(a)	0
F-41, Skeel Ave. to Rea Rd.	60	0	30	0	20	0	50	0	20	0	(a)	0
F-41, Rea Rd. to north County line	40	0	20	0	(a)	0	30	0	20	0	(a)	0
Cedar Lake Rd., F-41 to Loud Rd.	50	1	20	0	(a)	0	20	0	(a)	0	(a)	0
Loud Rd., Cedar Lake Rd. to Loud Island	20	0	(a)	0	(a)	0	(a)	0	(a)	0	(a)	0
River Rd., Detroit and Mackinac Railroad to Grass Lake Rd.	40	0	20	0	(a)	0	20	0	(a)	0	(a)	0
Rea Rd., River Rd. to F-41	20	0	(a)	0	(a)	0	20	0	(a)	0	(a)	0
Bissonette Rd., Rea Rd. to Alvin Rd.	20	0	(a)	0	(a)	0	20	0	(a)	0	(a)	0

Note: (a) Contained within roadway.

Closure Baseline. At closure it is assumed that there would be no aircraft operations and, therefore, there would be no areas impacted by aircraft noise.

The projected noise levels for the closure baseline were calculated using the surface traffic projections at base closure (Appendix J). The results of the modeling for the roadways analyzed are presented in Table 3.4-7. At closure, 682 people would reside in areas exposed to surface traffic noise levels of DNL 65 dB or greater. Again, the actual distances to the DNLs may be less than those presented in the table because the model does not account for screening effects of intervening buildings, terrain, and walls.

3.4.4.2 Noise-Sensitive Areas. The preclosure ROI for Wurtsmith AFB includes noise-sensitive receptors such as residences that are within the DNL 65 dB contour. The modeled contours (see Figure 3.4-3) indicate that there are 37,500 acres exposed to DNL 65 dB or greater in and around Wurtsmith AFB. This includes 17,700 acres with approximately 3,300 residents in the region between DNL 65 and 70 dB, 11,300 acres with approximately 2,200 residents in the region between DNL 70 and 75 dB, and 8,500 acres with approximately 4,300 residents in the region of DNL 75 dB or greater. Section 3.2.3, Land Use and Aesthetics, describes land uses on and near the base.

3.4.5 Biological Resources

Biological resources include the native and introduced plants and animals in the project area. For discussion purposes, these are divided into vegetation, wildlife (including aquatic biota), threatened and endangered species, and sensitive habitats. A reconnaissance survey of the base and surrounding area was conducted in April 1992.

The ROI used for discussions of biological resources present and potential impacts on these resources is Wurtsmith AFB and the surrounding area within approximately 5 miles of the base. A list of species potentially present on Wurtsmith AFB and in the vicinity is presented in Table I-1, Appendix I.

3.4.5.1 Vegetation. Prior to development, the sandy soils on Wurtsmith AFB probably supported extensive mixed forests, which were transitional between the boreal forests to the north and the deciduous forests to the south and southeast. This portion of Michigan has been logged in the past and the current forests do not contain old growth. The distribution of vegetation on Wurtsmith AFB is shown in Figure 3.4-4.

The majority of the base within the security fence has been altered by human activity. Where there are remnant stands of forest, they are either extremely small or disturbed through heavy use. However, property outside

EXPLANATION

①	Landscaped	⑤	Forest	⑨	Water
②	Agriculture *	⑥	Swamp/Marsh		Developed
③	Grassland	⑦	Tundra *		Disturbed
④	Shrubland *	⑧	Barren		Base Boundary

0 750 1500 3000 Feet

* Not Applicable

Note: Figure 1.2-1 shows Air Force fee-owned property.

Vegetation

Figure 3.4-4

the security fence is relatively undisturbed, extensive, and ecologically valuable. This property includes a large area of forested land north of the airstrip, and smaller areas southeast of the runway along the floodplain of the Au Sable River. The northern area is bordered by the Au Sable State Forest to the west and north, and privately owned forest to the east.

There are 1,392 acres of forest on Wurtsmith AFB including transitional mixed deciduous/evergreen forest, planted forest, and forested wetland. Most of the undisturbed areas on base are transitional mixed deciduous/ evergreen forests dominated by red oak, jack pine, and northern or red pine. Bigtooth aspen is usually found near the edges of these forests. Forested areas vary in tree density and species composition as well as understory species and densities. Most of these areas are closed-canopy forests. Understory species of the mixed deciduous/evergreen forests include Labrador tea, late low blueberry, sweet fern, bracken fern, bush honeysuckle, spreading dogbane, barren strawberry, and serviceberry.

Small patches of mature mixed forest are found throughout Wurtsmith AFB, including the northeast boundary of the base and the ski trail and training area in the southern portion of the base. Understory species are generally sparse in these areas. The largest concentration of mature mixed forest is surrounding, and just north of, the small arms range, outside the security fence. Farther north, closer to the wetland areas, the canopy becomes more open and there is a dense understory of Labrador tea.

A large area west of the north-south section of Rea Road has been disturbed previously and now supports a young mixed forest made up of jack pine, red pine, and red oak, growing to a height of about 6 feet. There is also a relatively pure stand of young pines in the now inactive landfill area.

Forested wetland and swamp/marsh habitat are described in Section 3.4.5.4, Sensitive Habitats.

Disturbed grasslands cover a total of 1,712 acres on base. Most of these areas are dominated by meadow fescue, orchard grass, native grasses, sedges, and other herbaceous plants. Large shrubby species such as staghorn sumac and willow grow on the edges of some disturbed grassy areas. Included within this category are the areas around the runways and associated base facilities, which are maintained grassy lawns. Different areas have different mowing specifications and schedules but the minimum height is between 3 and 5 inches and the maximum height is between 6 and 8 inches.

Sites dominated by shrub cover are uncommon. Where present, they are probably the result of disturbance rather than some other environmental condition, such as change in soil type. Solitary shrubs appear in some

disturbed grassland areas, and shrubs cover a portion of the inactive landfill in the northern part of the base.

Developed areas occupy 395 acres on base and include unvegetated places that are paved, graded, filled, or covered with structures.

Landscaped areas cover 607 acres. The areas around the base housing and the cantonment are planted with many species of deciduous and evergreen shrubs and trees.

Several common types of herbicides are used between April and October for control measures on lawns, along roadsides, around the runway areas, and along the fenceline.

Air Force Fee-Owned Land. The Air Force fee-owned property contains primarily areas that are categorized as landscaped or disturbed grassland. There are also several small forest areas adjacent to family housing in the southeastern corner of the base and along County Road F-41 in the eastern portion of the base.

3.4.5.2 Wildlife. Wurtsmith AFB lies in a transitional zone between the boreal forest to the north and the deciduous forest to the south. The presettlement wildlife was also transitional in nature and included species from the northern and southern forest habitats, i.e., red and gray squirrels, snowshoe hare and eastern cottontail, and spruce and ruffed grouse. Currently, many of the species originating from the north that once frequented the region (such as moose, elk, gray wolf, wolverine, and marten) are either rare or no longer found in the area. The fauna now comprise more southerly species representative of successional stages of forest growth (Stearns-Rogers Services, Inc., 1984). Typical species include white-tailed deer, coyote, striped skunk, raccoon, opossum, gray and fox squirrels, eastern cottontail, and ruffed grouse. Wildlife activity is highest in the undisturbed habitats along the Au Sable River floodplain and in the northwest section of the base, and is lowest in areas disturbed by human activities and urbanization, where little natural habitat remains.

The habitat areas within the security fence of Wurtsmith AFB support few large mammals but a wide variety of small mammals and birds. No hunting is permitted within the security fence. Small mammals such as gray and fox squirrels, thirteen-lined ground squirrel, eastern chipmunk, deer mouse, and house mouse are common to the developed and landscaped areas of the base. The little brown bat forages for insects over these open areas after dark. Birds that frequent the developed and landscaped areas on base include European starling, robin, house sparrow, crow, and house finch.

The inactive landfill in the northern portion of the base is covered by grasses, other herbs, and small woody shrubs, and is surrounded by stands

of mixed woodlands. This area provides habitat for the Virginia opossum, snowshoe hare, masked shrew, striped skunk, woodchuck, white-footed mouse, and meadow vole (Schuman, 1987). The open area also provides foraging habitat for the American woodcock, wild turkey, eastern bluebird, and field sparrow. The abundance of prey attracts predators such as coyote, long-tailed weasel, badger, great horned owl, red-tailed hawk, and American kestrel.

The forested areas within the fence boundary provide habitat for the raccoon, skunk, chipmunk, squirrel, rabbit, mouse, and a variety of songbirds such as black-capped chickadee, tufted titmouse, red-breasted nuthatch, palm warbler, song sparrow, and American tree sparrow.

White-tailed deer occur in all the habitats outside the security fence but are more common where there are small herbaceous and brushy openings in the forest cover. Coyote, gray fox, and occasionally black bear hunt throughout the forest. Gray and fox squirrels are common where there are oaks in maturing hardwood stands. The northern flying squirrel is found in mature forest stands where snags provide dens and dense canopies allow arboreal lichens to grow. Slow-flowing Dry Creek meanders through the forest to the east of the large wetland in the northwestern part of the base, and provides excellent habitat for beaver, which utilize the maple, alder, and birch trees for food and for the construction of dams and lodges. Raccoon, mink, muskrat, and long-tailed weasel also reside near the creek (U.S. Department of Agriculture, n.d.).

The forest and wetland habitats of Wurtsmith AFB support over 200 species of birds. The barred owl, great horned owl, northern saw-whet owl, Cooper's hawk, sharp-shinned hawk, and red-tailed hawk nest in the forests and hunt over all habitats of the base. A variety of woodpeckers, including the pileated woodpecker, inhabit the mature forests. Game birds such as ruffed grouse, wild turkey, and American woodcock forage in the forest undergrowth. Numerous songbirds nest in the diverse vegetation types of the base. The chestnut-sided warbler and golden-winged warbler inhabit deciduous tree-dominated stands, the Lincoln's sparrow prefers young conifers, and the scarlet tanager prefers the maturing mixed forests. A variety of waterfowl may be found in the wetland areas on and near Wurtsmith AFB. Common types include the Canada goose, ring-billed gull, American coot, green-winged teal, wood duck, and canvasback.

Reptiles and amphibians are associated primarily with the wetland habitats outside the fence. Reptiles found in and near the wetland areas include eastern box turtle, five-lined skink, and several species of snake, including the northern water snake, northern ringneck snake, and red-bellied snake. The hognose snake and blue racer may be found in the woodlands and brushy areas of the base. The wood turtle, a state-listed Species of Special Concern (a watch list species), is found in the mature forest in the

northwestern area of the base. The eastern gray treefrog, pickerel frog, American toad, spring peeper, and eastern newt are among the many amphibian species that reside in the wooded swamps and streams of the region.

There is no permanent surface water on Wurtsmith AFB so no fish species are present. The Au Sable River, Lake Huron, and Van Etten Lake provide habitat for several species of fish, including the lake sturgeon and channel darter, considered sensitive by the state and federal governments (see Appendix I). Brown trout, walleye, crappie, largemouth bass, yellow perch, and bluegill are some of the common game fish occurring in these water bodies.

Air Force Fee-Owned Land. Wildlife present on the Air Force fee-owned portions of the base property are classified as developed and disturbed. The wildlife present is as previously described for that habitat.

3.4.5.3 Threatened and Endangered Species. The Michigan Natural Features Inventory, U.S. Fish and Wildlife Service (USFWS), and published literature were consulted for information on rare and protected species. USFWS has indicated that no state- or federally listed threatened or endangered species are known to occur at Wurtsmith AFB (see letter in Appendix L). However, based on known habitat requirements and distribution, a number of state- and federally listed threatened, endangered, and candidate species may occur. Table I-2 in Appendix I summarizes information on habitat requirements and distribution of species in the vicinity that are listed or candidates for listing as federal or state threatened or endangered.

Candidate species known to occur at Wurtsmith AFB include the massasauga rattlesnake and secretive locust, both considered Category 2 candidates for federal listing as a threatened or endangered species and state-listed Species of Special Concern (a watch list of species whose numbers, distribution, or habitat may be declining). The massasauga occurs in the swampy areas along the Au Sable River floodplain on base. One undated sighting of the secretive locust is reported in the Michigan Natural Features Inventory from the large forested wetland in the northwest portion of the base. Many other sightings of the secretive locust in boggy areas near Oscoda were reported in the 1930s (Hubbell and Cantrall, 1938).

Although not known to occur on base, several additional listed and candidate species may be present in the vicinity of the base. Kirtland's warbler, federally and state-listed as endangered, is present 1 mile south of the base in the Huron National Forest Kirtland's Warbler Management Area. The warbler nests in young jack pine forests when the trees are between the ages of 8 and 25 years. A previous report indicated that Wurtsmith AFB and its immediate vicinity did not have habitat suitable for the Kirtland's

warbler (U.S. Department of Agriculture, Forest Service, 1983). Over time, however, there is a potential for development of suitable habitat at Wurtsmith AFB as stands of jack pine on base reach the appropriate age and habitat elsewhere is lost (Weise, 1992). Lake cress, a plant listed by the state as threatened and a federal candidate for listing, and wild rice, a state-listed threatened species, may occur downstream along the Au Sable River but have not been recorded on the base.

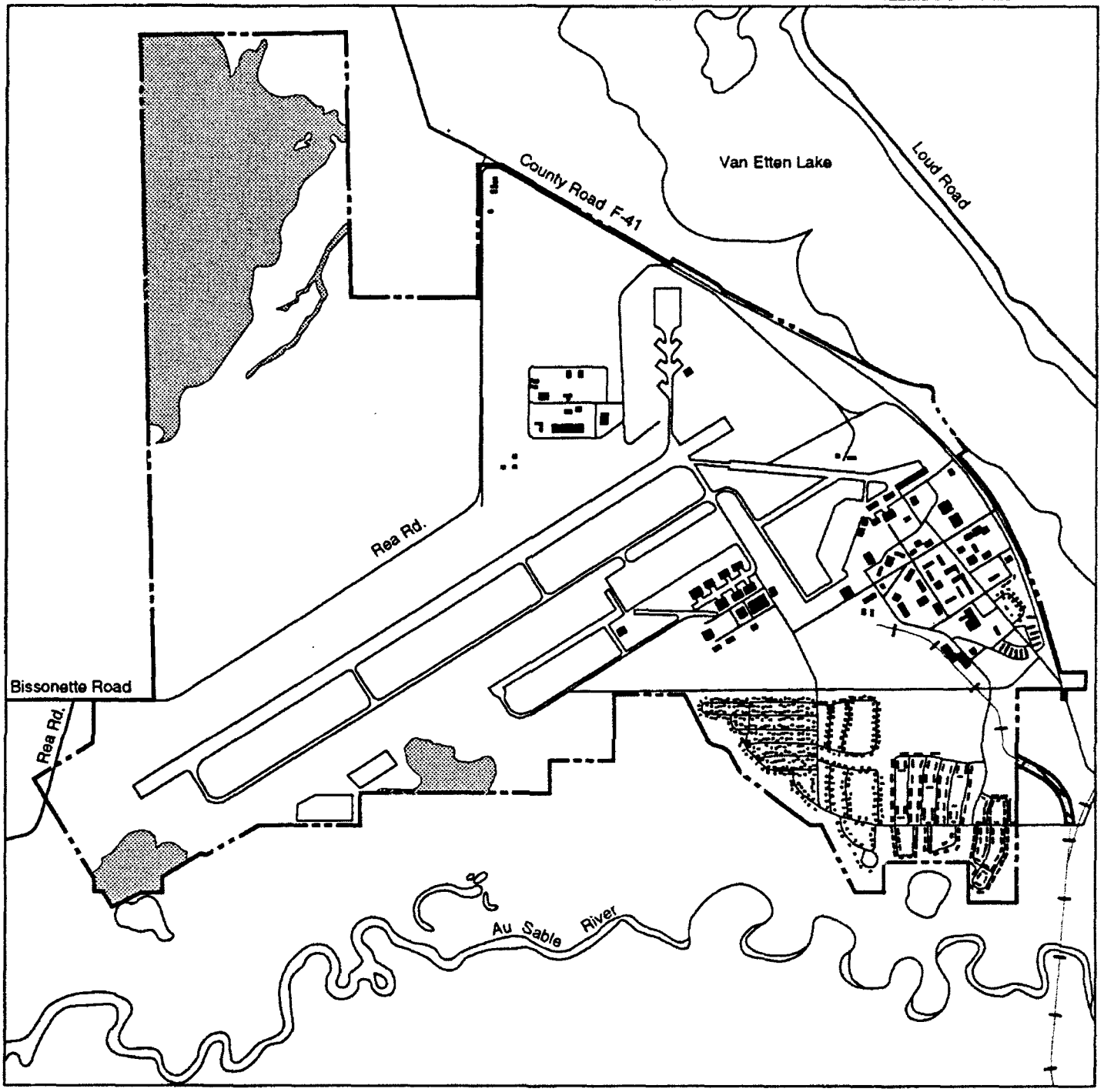
Air Force Fee-Owned Land. There are no threatened or endangered species known to be present on the Air Force fee-owned portion of the base property, although the federal candidate Massasauga rattlesnake lives in the wetlands in the fee-owned area at the southwestern end of the runway.

3.4.5.4 Sensitive Habitats. Sensitive habitats include wetlands; plant communities that are unusual or of limited distribution; threatened, endangered, and sensitive species habitat; and important seasonal use areas for wildlife (e.g., breeding areas). Wetlands are the primary sensitive habitats on Wurtsmith AFB (Figure 3.4-5).

Data from several sources including the Base Comprehensive Plan, USGS topographic maps, federal and state agencies, and interpretation of aerial photographs supported by site visits indicate the presence of extensive forested wetlands, as depicted in Figure 3.4-5. Wetlands are defined as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (U.S. Army Corps of Engineers, 1987). The majority of jurisdictional wetlands in the United States meet three wetland delineation criteria (hydrophytic vegetation, hydric soils, and wetland hydrology) and are subject to Section 404 of the federal Clean Water Act. The wetlands on Wurtsmith AFB meet all three wetland delineation criteria. In the State of Michigan, the Goemaere-Anderson Wetland Protection Act also regulates the use of wetlands.

The 438-acre forested wetland in the northwest corner of the base is dominated almost exclusively by northern white cedar, although black spruce, paper birch, and very thick sphagnum moss are also present. Most of the ground was covered by standing water during a field survey conducted in late April 1992. In areas lacking standing water, the soil was saturated and covered with a thick mat of moss.

Dry Creek is dammed in many locations by beavers, resulting in a network of ponds. The area surrounding the creek is a mixed forest of red oak and jack pine. Silver maple is the dominant tree species on the edge of this wetland, and common alders grow in the deeper part of the stream.



EXPLANATION

Base Boundary

Wetlands

Sensitive Habitats

0 750 1500 3000 Feet

Note: Figure 1.2-1 shows Air Force fee-owned property.

Figure 3.4-5

Swamp/marsh land occupies 67 acres on base along the Au Sable River floodplain south of the runway. This habitat is frequently covered with standing water and supports a variety of vegetation, including cattails, paper birch, Labrador tea, common alder, northern white cedar, and sphagnum moss. Also present in the southern wetlands are sedges, willows, skunk cabbage, star flower, swamp dewberry, tamarack, bunchberry, lady fern, flowering or royal fern, sensitive fern, and silky dogwood. These wetlands provide habitat for the federal candidate massasauga rattlesnake (see Section 3.4.5.3). A section of this floodplain may be contaminated by pollutants originating from on-base activities. Investigation and remediation, as needed, are under way as part of the IRP (see Section 3.3.3).

The large forested areas outside the base security fence may also be considered sensitive habitat. Much of the land in this part of Michigan has been cleared, and large stands of forest are limited. The mature mixed evergreen/deciduous forest north of the runway provides important habitat for wildlife including the wood turtle, a state-listed Species of Special Concern. The area also serves as a buffer between disturbed habitats and the large wetland in the northwest portion of the base. The planted forest dominated by young jack pine to the west of the north-south segment of Rea Road may represent potential habitat for the Kirtland's warbler, federally and state-listed as endangered (see Section 3.4.5.3).

Air Force Fee-Owned Land. Approximately 30 acres of swamp/marsh are present on the Air Force fee-owned land at the southwestern end of the runway (see Figure 3.4-5).

3.4.6 Cultural Resources

Cultural resources are prehistoric and historic sites, structures, districts, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious or any other reason. Cultural resources have been divided for ease of discussion into three main categories: prehistoric resources, historic structures and resources, and traditional resources. These types of resources are defined in Appendix E, Methods. For the purposes of this analysis, paleontological remains, the fossil evidence of past plant and animal life, have been included within the cultural resources category.

The ROI for the analysis of cultural resources includes all areas within the base boundaries, whether or not certain parcels would be subject to ground disturbance. For this analysis, the ROI is synonymous with the Area of Potential Effect as defined by regulations implementing the National Historic Preservation Act (NHPA). The potential conveyance of federal property to a private party or non-federal agency constitutes an undertaking, or a project that falls under the requirements of cultural resource legislative mandates, because any historic properties located on that property would cease to be

protected by federal law. However, impacts resulting from conveyance could be reduced to a nonadverse level by placing preservation covenants on the lease or disposal document. Reuse activities within designated parcels that may affect historic properties would require the reuser to comply with the requirements contained in the preservation covenants.

Numerous laws and regulations require federal agencies to consider the effects of a proposed project on cultural resources. These laws and regulations stipulate a process for compliance, define the responsibilities of the federal agency proposing the action, and prescribe the relationship among other involved agencies (e.g., State Office of Historic Preservation and the Advisory Council on Historic Preservation). Methods used to achieve compliance with these requirements are presented in Appendix E.

Only those potential historic properties determined to be significant under cultural resource legislation are subject to protection or consideration by a federal agency. The quality of significance, in terms of applicability to National Register of Historic Places (NRHP) criteria and of integrity, is discussed in Appendix E, Methods. Significant cultural resources, either prehistoric or historic in age, are referred to as "historic properties."

In compliance with the NHPA, the Air Force has initiated the Section 106 review process with the Michigan SHPO. The most recent records search for cultural resources on Wurtsmith AFB was conducted in 1990. At that time, the site files of the Bureau of History and the holdings of the State Library of Michigan were examined to assess the cultural resource potential of the base (Branstner, 1991). Reports of previous surveys were also consulted. Initially, the SHPO indicated that "the project [disposal and reuse of the base] will affect no historic properites (no known sites eligible for listing in the National Register of Historic Places) and that the project is cleared under federal regulation 36 CFR 800 for the "Protection of Historic Properties." Subsequently, after further research, the SHPO withdrew this finding, and recommended further investigations (Appendix L).

3.4.6.1 Prehistoric Resources. Paleo-Indian people first entered southern Michigan around 11,500 years ago. However, the Iosco County area was probably not occupied until the very end of the Paleo-Indian period, being submerged before that time. The Archaic period lasted from 10,000 to 2,500 years ago. Sites of this period are rare until late in the period, when people exploited the river, lake, and forest environments for fish, plant foods, deer, and waterfowl. During the Woodland period, beginning around 600 B.C., pottery was first developed and new burial practices were introduced. The Late Woodland period, which began around A.D. 700, witnessed an increase in the number and variety of sites, primarily associated with fishing and hunting activities (Prahl, 1989).

The majority of Wurtsmith AFB has been inspected by archaeologists. Shovel testing at 10-meter intervals of 26 acres, in 1983, produced no cultural material. A 1988 surface survey at 15- to 60-meter intervals covered 211 acres (Prahl, 1989); limited subsurface testing was conducted in areas considered sensitive for cultural resources. Two prehistoric archaeological sites (20Is87 and 20Is88) and three isolated prehistoric artifacts were found as a result of these investigations.

Site 20Is87 is a low-density scatter of chipped stone and fire-cracked rock on top of Nipissing dune. The site was dated to the Middle Woodland period and it was possibly also used during the Middle and Late Archaic periods. Limited test excavations revealed no subsurface component. Site 20Is88 is on the Au Sable River bluff outside the perimeter fence at the end of the runway. It is a small, low-density lithic scatter with no subsurface component. These two sites are not considered eligible for listing on the NRHP.

In 1990, a surface survey at 15-meter intervals was performed on 850 acres on base (Branstner, 1991). One prehistoric site (20Is98), consisting of a thin scatter of chert flakes and fire-cracked rock, was found on a bluff overlooking the Au Sable River valley. When the site was inspected again in 1992, a projectile point, probably dating from the Late Woodland period, and scattered stone flakes were observed. This site has not been evaluated; therefore, until testing is complete and SHPO concurrence has been obtained on a determination of eligibility, the site must be considered eligible.

Due to poor ground visibility, the Michigan SHPO has recommended that additional subsurface investigations (e.g., augers, shovel test pits) be conducted prior to completion of identification efforts required under Section 106 of the NHPA. Further consultation with the SHPO is planned to complete the Air Force's responsibilities under Section 106 of the NHPA.

3.4.6.2 Historic Structures and Resources. The historic period in the region began during the 17th century with the arrival of the first Europeans, who began trading, trapping, and lumbering activities in the area in the early 1800s. According to base records, no structures built before 1941 remain on the base. Of the buildings constructed between 1941 and 1943, according to real property records, only six remain. The six buildings have been inspected, photographed, and evaluated. The Air Force concluded, and the Michigan SHPO concurred, that none of the buildings is eligible for listing on the NRHP because they lack integrity. The NRHP criteria used to define significance are listed in Appendix E.

An abandoned narrow-gauge railroad bed in the southwestern portion of the base has been recorded but has not received a formal site designation. This railroad was probably part of the Au Sable and Northwestern Railroad, 50 miles long, built around 1883 for use by the J.E. Potts Salt and Lumber

Company at the mouth of the Au Sable River (Prahl, 1989) and used until the fire of 1911.

3.4.6.3 Traditional Resources. In 1990, the Michigan Commission of Indian Affairs and local representatives of the Chippewa and Ottawa, Native American groups traditionally associated with northeastern Michigan, were contacted to identify any known sacred areas or other concerns within Wurtsmith AFB. No known areas or resources of importance to modern Native Americans have been identified.

3.4.6.4 Paleontological Resources. Wurtsmith AFB lies on a sandy plain formed by the retreat of ancient seas and large-scale glacial movement. Bedrock formations in the vicinity of the base are covered with at least 100 feet of glacial deposits. No paleontological resources have been found on the base, and none are expected.

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter discusses the potential environmental consequences associated with the Proposed Action and alternatives. To provide the context in which potential environmental impacts may occur, discussions of potential changes to the local communities, including population, land use and aesthetics, transportation, and community and public utility services are included in this EIS. In addition, issues related to current and future management of hazardous materials and wastes are discussed. Impacts to the physical and natural environment are evaluated for soils and geology, water resources, air quality, noise, biological resources, and cultural resources. These impacts may occur as a direct result of disposal and reuse activities or as an indirect result caused by changes within the local communities. Possible mitigation measures to minimize or eliminate the adverse environmental impacts are also presented.

Cumulative impacts result from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (Council on Environmental Quality, 1978). No other reasonably foreseeable future actions have been identified in the region that could contribute to potential cumulative impacts; therefore, cumulative impacts are not discussed.

Means of mitigating adverse environmental impacts that may result from implementation of the Proposed Action and alternatives are discussed as required by NEPA. Mitigation measures are suggested for those components likely to experience substantial and adverse changes under any or all of these alternatives. Potential mitigation measures depend upon the particular resource affected. In general, however, mitigation measures are defined in CEQ regulations as actions that include:

(a) Avoiding the impact altogether by not taking an action or certain aspect of the action

(b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation

(c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment

(d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action

(e) Compensating for the impact by replacing or providing substitute resources or environments.

A discussion of the effectiveness of mitigation measures is included for those resource areas where it is applicable, as in the case of mitigation measures for impacts to biological resources. Where appropriate, a discussion regarding the probability of success associated with a particular mitigation is included.

Although reuse development would be decided by recipients and local zoning authorities, probable reuse scenarios were evaluated to analyze environmental impacts.

Alternatives are defined for this analysis on the basis of (1) plans of local communities and interested individuals, (2) general land use planning considerations, and (3) Air Force-generated plans to provide a broad range of reuse options. Reuse scenarios considered in this EIS must be sufficiently detailed to permit environmental analysis. Initial concepts and plans are taken as starting points for scenarios to be analyzed. Available information on any reuse alternative is then supplemented with economic, demographic, transportation, and other planning data to provide a reuse scenario for analysis. It is projected that 20 years or more would be required to fully develop the base under civilian reuse.

4.2 LOCAL COMMUNITY

This section discusses potential effects on local communities as a result of disposal and reuse of Wurtsmith AFB.

4.2.1 Community Setting

Socioeconomic effects are addressed here only to the extent that they are interrelated with the biophysical environment. A complete assessment of socioeconomic effects is presented in the *Socioeconomic Impact Analysis Study, Disposal and Reuse of Wurtsmith AFB.* The following discussion is limited to the key employment and population effects of the Proposed Action and alternatives in comparison to projected conditions under the No-Action Alternative.

Under the No-Action Alternative, site-related employment levels of 50 direct and 11 secondary jobs are projected throughout the 20-year analysis period. Without reuse, total ROI employment is forecasted to increase from 33,495 at closure to 35,604 in 2013, an average annual growth rate of 0.3 percent per year (extrapolated from a projection by the Michigan Department of Management and Budget, 1985). The total ROI population without reuse would increase from 78,139 persons at closure to 82,900 in 2013, an average annual increase of 0.3 percent.

This analysis recognizes the potential for impacts to communities arising from "announcement effects" stemming from information regarding the base's closure or reuse. Such announcements may affect community perceptions and, in turn, could have important local economic effects. An example would be the in-migration of people anticipating employment under one of the reuse options. If it were later announced that the No-Action Alternative was chosen, many of the newcomers would leave the area to seek employment elsewhere. Such an effect could, therefore, result in an initial, temporary increase in population followed by a decline in population as people leave the area. Changes associated with announcement effects, while potentially important, are highly unpredictable and difficult to quantify. Therefore, such effects were excluded from the quantitative analysis in this study, and are not included in the numeric data presented in this report.

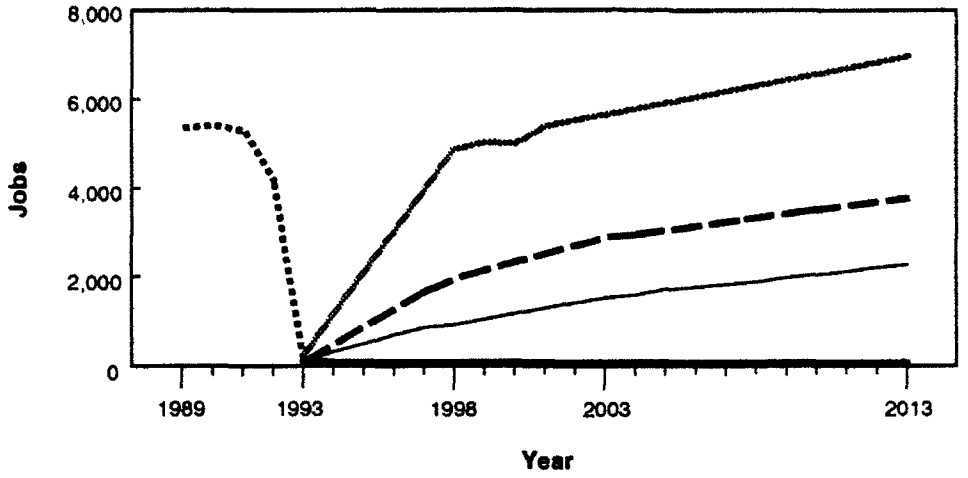
4.2.1.1 Proposed Action. Reuse activities at Wurtsmith AFB under the Proposed Action would generate an increase of 4,285 direct jobs and 2,582 secondary jobs by 2013, compared to the 50 direct and 11 secondary jobs projected under the No-Action Alternative. All direct jobs would be located on site, in Oscoda Township. Secondary jobs would be created throughout the ROI. Approximately 49 percent of direct jobs and 10 percent of secondary jobs are projected to be held by in-migrating workers. Total employment in the ROI would be 42,471 in 2013 under the Proposed Action, an increase of 19 percent over No-Action Alternative projections for that year. ROI employment growth is projected to average 1.2 percent annually between closure and 2013. Figure 4.2-1 shows the effects of the Proposed Action and alternatives on employment levels in the ROI.

Population in the ROI would increase by 8,352 from closure to 2013 as a result of new employment generated by the Proposed Action (Figure 4.2-2). Thus, ROI population is expected to increase by an average of 0.8 percent per year between closure and 2013, to a total of 91,252; that figure represents an increase of 10 percent over No-Action Alternative projections for that year. Most of the in-migrants are expected to locate in Oscoda, Au Sable, and Greenbush townships.

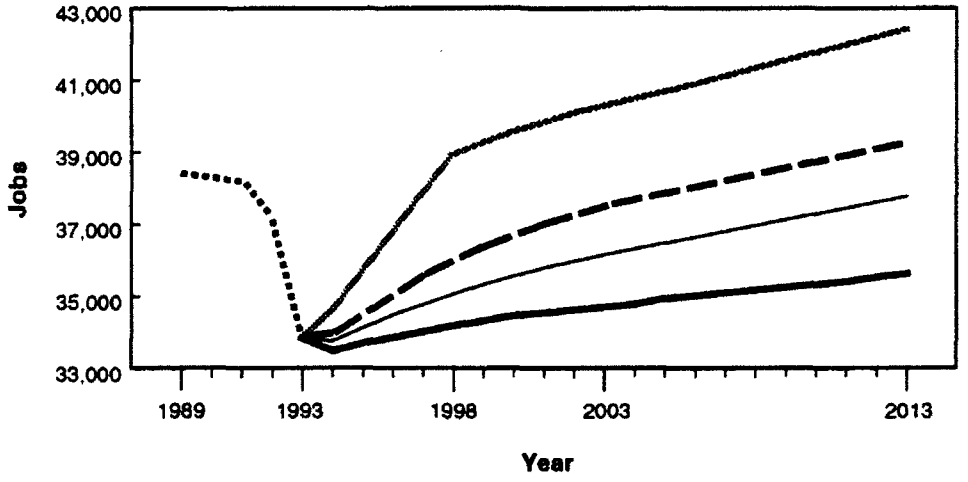
4.2.1.2 Fire Training Alternative. The level of economic activity under this alternative would be less than that projected for the Proposed Action. Reuse of the base under this alternative would generate an increase of 2,498 direct jobs and 1,191 secondary jobs by 2013 (Figure 4.2-1), compared to the 50 direct and 11 secondary jobs projected under the No-Action Alternative. Approximately 49 percent of direct jobs and 10 percent of secondary jobs are projected to be held by in-migrating workers. Total employment in the ROI would be 39,293 in 2013 under this alternative, an increase of 10 percent over No-Action Alternative projections for that year. ROI employment growth is projected to average 0.8 percent per year between closure and 2013.

ALTERNATIVE	1993[a]	1998	2003	2013
Proposed Action	61	4,781	5,607	6,867
Fire Training	61	1,878	2,789	3,689
Recreation	61	845	1,450	2,185
No-Action	61	0	0	0

Reuse-Related Employment Effects



Reuse-Related Employment Effects[b]



Total Employment Including Reuse Effects

EXPLANATION

- Preclosure
- Proposed Action
- Fire Training Alternative
- Recreation Alternative
- No-Action Alternative

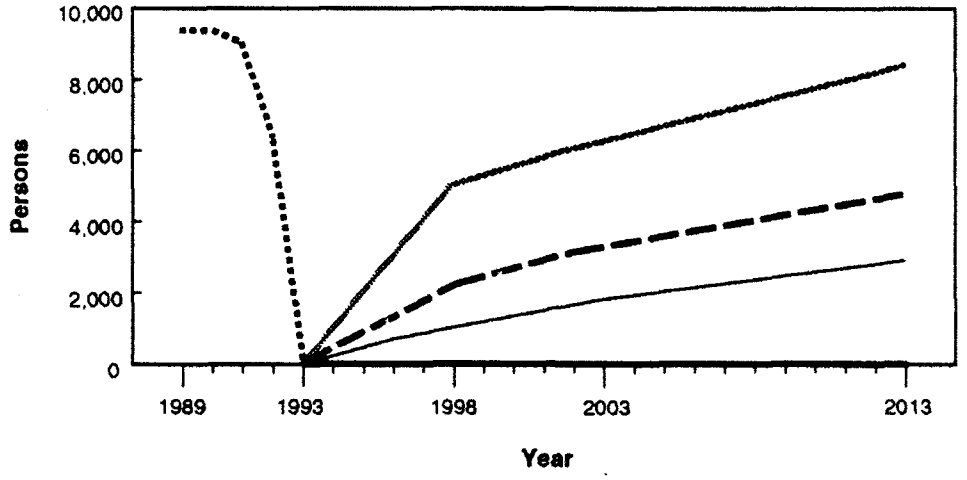
Reuse-Related Employment Effects

(a) The 1993 values represent total base-related employment under the closure baseline.
(b) Employment effects represent the change in employment relative to the No-Action Alternative.

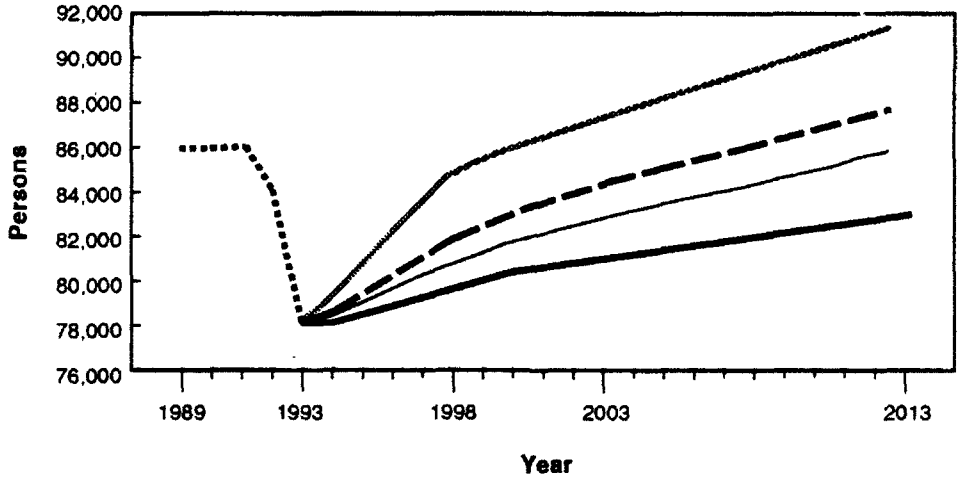
Figure 4.2-1

ALTERNATIVE	1993	1998	2003	2013
Proposed Action	0	5,002	6,203	8,352
Fire Training	0	2,148	3,275	4,749
Recreation	0	977	1,736	2,835
No-Action	0	0	0	0

Reuse-Related Population Effects



Reuse-Related Population Effects



Total Population Including Reuse Effects

EXPLANATION

- Preclosure
- Proposed Action
- Fire Training Alternative
- Recreation Alternative
- No-Action Alternative

Reuse-Related Population Effects

Figure 4.2-2

Population in the ROI would increase by 4,749 persons between closure and 2013 as a result of the Fire Training Alternative (see Figure 4.2-2), an average growth rate of 0.6 percent per year. Total ROI population in 2013 with this alternative would be 87,649, an increase of 6 percent over No-Action Alternative projections for that year. The geographic distribution of employment and population growth is expected to be similar to that discussed under the Proposed Action.

4.2.1.3 Recreation Alternative. This alternative would create an increase of 1,473 direct jobs and 712 secondary jobs in the ROI by 2013 (see Figure 4.2-1), compared with 50 direct jobs and 11 secondary jobs projected under the No-Action Alternative. Approximately 49 percent of direct jobs and 10 percent of secondary jobs are projected to be held by in-migrating workers. This represents a 0.6-percent annual average employment growth during this 20-year period. By 2013, employment in the ROI would total 37,789, an increase of 6 percent over No-Action Alternative projections for that year.

Population in the ROI is projected to increase by 2,835 persons between closure and 2013 (see Figure 4.2-2), an average growth of 0.5 percent annually. Total population in the ROI in 2013 would reach 85,735 with this alternative, an increase of 3 percent over No-Action Alternative projections for that year. The geographic distribution of employment and population growth is expected to be similar to that discussed under the Proposed Action.

4.2.1.4 No-Action Alternative. Under the No-Action Alternative, only caretaker activities would occur at the base. It is estimated that the caretaker activities at Wurtsmith AFB would maintain approximately 50 direct and 11 secondary jobs in the ROI through 2013. By 2013, total employment in the ROI is projected to reach 35,604, and total population in the ROI is expected to be 82,900.

4.2.1.5 Other Land Use Concepts. The Advanced Environmental Technology Facility would result in a minimal (less than 1 percent) increase in the ROI population. Up to 20 direct jobs would be generated under this reuse.

4.2.2 Land Use and Aesthetics

This section discusses the Proposed Action and alternatives relative to land use and zoning to determine potential impacts in terms of general plans, zoning, land use, and aesthetics. Land use compatibility with aircraft noise is discussed in Section 4.4.4, Noise.

4.2.2.1 Proposed Action

General Plans. The GDP for Oscoda Township provides for a variety of future development options in the vicinity of the base and includes primarily open space, some residential, and a few recreational land uses. Planned on-base land uses under the Proposed Action are generally compatible with the general plans for surrounding land uses. However, the retention of residential areas in the southeastern part of the base may be inconsistent with the adjacent off-base industrial uses identified in the GDP.

Zoning. The Township of Oscoda is in the process of amending its zoning ordinance to encompass the base. The Proposed Action land uses are generally compatible with adjacent zoning. The Proposed Action, however, would introduce land uses not previously categorized in the zoning ordinance, including airfield, aviation support, institutional, and public facilities/recreation.

The proposed airport operational parameters would require that future zoning for areas at each end of the runway be compatible for noise and safety.

Land Use. The Proposed Action would result in some changes to the land use patterns within the ROI. The major changes would be associated with conversion of existing military land uses to a variety of mixed civilian land uses. Specific changes in major on-base land use categories associated with the Proposed Action would include:

- The airfield land use would decrease by 347 acres, including aircraft safety zones, taxiways, and apron areas not incorporated into the proposed civilian airfield.

- The aviation support land use would increase by 169 acres, including the conversion of public facilities/recreation (open space) areas and a portion of the airfield proposed for reuse as future aviation-related development.

- The industrial land use category would decrease by 164 acres, primarily as a result of converting the waste treatment settling ponds and the grenade range to public facilities/recreation uses.

- Commercial land use areas would increase by 134 acres, developing commercial office, retail, and convention/tourist uses in facilities now used for a variety of administrative, service, and community commercial activities.

- The residential areas would decrease by 32 acres as a result of converting housing areas in the cantonment to commercial (convention/tourist) areas.

- The public facilities/recreation land use areas would increase by 255 acres with the inclusion of the areas at both ends of the runway.

The proposed on-base land uses would generally be compatible with one another, except in one area where the proposed commercial/tourist land use may not be fully compatible with nearby industrial and aviation support land uses because of potential noise, safety, traffic, and air quality impacts and concerns.

Any dredging, filling, or construction of a permanent structure below the ordinary high water mark of Van Etten Lake or dredging within 500 feet of Van Etten Lake would require a permit from the MDNR under Michigan's Inland Lakes and Streams Act (Public Act 346, 1972).

Section 4(f) of the DOT Act provides that the Secretary of Transportation shall not approve any transportation-related program or project which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land of an historic site of national, state, or local significance as determined by the officials having jurisdiction thereof unless there is no feasible or prudent alternative to the use of such land and such program or project includes all possible planning to minimize harm resulting from the use. No wildlife or waterfowl refuges or recreational facilities or parks will be directly impacted as a result of construction activities for airport or aviation-related development purposes at Wurtsmith AFB. The proposed reuse of the base includes making some existing on-base facilities available for public use which would then quality them as Section 4(f) lands. Under the Proposed Action, all noise contours of DNL 65 dB or greater would be contained within the airport boundary (see Section 4.4.4.1), and no public parks or recreation areas in the vicinity of Wurtsmith AFB would be exposed to incompatible noise levels. The only potentially significant cultural resource known on Wurtsmith AFB lies within property that is leased from and will return to the U.S. Forest Service after base closure. Therefore, any impact to the site would be subject to requirements of Section 106 of the NHPA, which calls for minimization of project effects to a non-adverse level. Based on this information, there should be no adverse impacts on Section 4(f) lands.

Aesthetics. The industrial and commercial development under the Proposed Action would alter the visual character of the cantonment, WSA, and alert area. With appropriate planning, design, and implementation of these land uses, the overall character of the region could be enhanced. The visual character of the wooded areas along much of the base boundary, the Au Sable River corridor, and the large forested tract in the northwest quadrant of the base would not be affected because development is not proposed in

these areas. The waste treatment settling ponds south of the western end of the runway would be closed.

Industrial development along the existing rail spur, aviation-related development south of the runway, and more intensive use of existing facilities visible from County Road F-41 and Rea Road could alter views of these areas. The possible addition of parking lots, streets, and increased activities would create a more urbanized setting.

Mitigation Measures. The Township of Oscoda would need to incorporate airfield, aviation support, institutional, and public facilities/recreation uses into other zoning categories set forth in the Township of Oscoda zoning ordinance or revise the zoning ordinance to include these categories. Minor land use conflicts within the cantonment area could be mitigated by appropriate use of key design elements, including landscape screening, building access orientation, and street design to visually separate land uses.

4.2.2.2 Fire Training Alternative

General Plans. The GDP for Oscoda Township provides for a variety of future development options in the vicinity of the base, including open space, residential, and recreational land uses. On-base land uses in the southern half of the base would be adjacent to compatible surrounding land uses. There is a potential for land use conflicts off base where the fire training areas are adjacent to lakeshore residential and recreation land uses, and the same conflicts discussed above for the Proposed Action.

Zoning. The Township of Oscoda is in the process of amending its zoning ordinance to encompass the base. The existing zoning pattern is generally compatible with adjacent land uses in the Fire Training Alternative. The Fire Training Alternative, however, would introduce land uses not previously categorized in the zoning ordinance, including institutional and public facilities/recreation.

Land Use. The Fire Training Alternative would result in changes to the land use patterns within the ROI. The amount and intensity of facility development would be greater than that under the Proposed Action. As under the Proposed Action, there would be noticeable changes in the land use patterns on base resulting from conversion to a variety of mixed land uses, including industrial, commercial, and institutional (education) components. Specific changes in major on-base land use categories associated with the Fire Training Alternative would include:

- The industrial land use category would decrease by 419 acres, primarily as a result of converting the former landfill north of the WSA, the grenade range northwest of Rea Road, and the WSA to institutional (fire training). Former aviation-related facilities

and areas would be converted to industrial areas, surrounded by open space buffer areas.

- The institutional (education) land use areas would comprise 3,115 acres, including the extensive fire training area and a small campus complex located in the cantonment. The mixed-use campus facilities were formerly used for community service and retail activities. The proposed fire training areas total 3,075 acres and include the former airfield, WSA, and alert area, which would be used for fire training activities, as well as large open areas that would be left undeveloped as buffers from adjacent land uses. The fire training academy proposes to use existing facilities, and plans little new facility development. Fire training activities would include classroom instruction, hands-on equipment and technical training, and actual fire-fighting episodes for all types of fires.

- Commercial land use areas would increase by 48 acres with the development of commercial office and retail services in facilities now used for aviation support, administration, service, and community commercial activities.

- The residential land use area would decrease by 136 acres as a result of converting residential areas in the cantonment to commercial areas, as well as converting the westernmost family housing *area to public* facilities/recreation.

- The public facilities/recreation land use areas would decrease by 1,115 acres. Most of this acreage would be converted to institutional (education) but would remain undeveloped as a buffer between fire training areas and adjacent uses.

The proposed land uses would generally be compatible with one another but, as in the Proposed Action, the proposed commercial office and retail land uses may not be fully compatible with nearby industrial development because of potential noise, safety, traffic, and air quality impacts and concerns. This incompatibility is the result of a planning choice to logically maintain the existing land use pattern and optimize facility usage.

Any dredging, filling, or construction of a permanent structure below the ordinary high water mark of Van Etten Lake or any dredging within 500 feet of Van Etten Lake would require a permit from the MDNR under Michigan's Inland Lakes and Streams Act (Public Act 346, 1972).

Aesthetics. The industrial and commercial development under the Fire Training Alternative would alter the visual character of the cantonment area. The visual character of the forested tract in the northwest quadrant of the base could be affected by some of the proposed fire training activities if

trees are burned or cleared for access or for training purposes. Fire training activities would occur on the southwest portion of the runway and would be visible from Rea Road. In addition, any smoke plumes generated by live burning could be visible for several miles. The wooded areas along much of the base boundary would remain undisturbed. As in the Proposed Action, the Au Sable River corridor would remain visually separated from all land uses. Industrial development along the rail spur and more intensive use of existing facilities adjacent to or visible from County Road F-41 could alter views of these areas by creating a more urbanized setting.

Overall development of the Fire Training Alternative could have an adverse effect on aesthetics in the area and thereby present a conflict with the natural environment that is a major recreational/tourist focus in the region.

Mitigation Measures. The Township of Oscoda would need to incorporate institutional and public facilities/recreation uses into other zoning categories in the township zoning ordinance or revise the zoning ordinance to include these categories. Potential mitigation of the fire training activities would include the modification or rescheduling of some activities, for example, not planning multiple fires simultaneously, scheduling fewer fires during the peak tourist season, or using fuels that produce less smoke. In addition, open space buffers and/or landscape screening between fire training areas and off-base land uses could lessen the visual impacts.

Minor land use conflicts within the cantonment could be mitigated as discussed under the Proposed Action.

4.2.2.3 Recreation Alternative

General Plans. The GDP for Oscoda Township provides for a variety of options for future development in the vicinity of the base, including open space, residential, and recreational land uses. On-base land uses in the Recreation Alternative are compatible with plans for surrounding areas, except in the southeast corner of the base, where the industrial area abuts the existing housing area.

Zoning. The Township of Oscoda is in the process of amending its zoning ordinance to encompass the base. However, the existing zoning pattern is generally compatible with adjacent land uses in the Recreation Alternative. The Recreation Alternative, however, would introduce land uses not previously categorized in the zoning ordinance, including institutional and public facilities/recreation.

Land Use. The Recreation Alternative would result in substantial changes to the land use patterns within the ROI. One significant change would be the mothballing or demolition of more than half of the base facilities, including the airfield and most of the residential structures, i.e., all of the former base

except portions of the cantonment, WSA, alert area, the former operational areas, and a small residential area. Specific changes in major on-base land use categories associated with the Recreation Alternative would include the following:

- The industrial land use category would decrease by 460 acres, primarily as a result of converting the former landfill north of the WSA, the grenade range, and the northern half of the alert apron to public facilities/recreation uses. Existing aviation-related areas, including aviation-related facilities, would be converted to industrial uses.

- The educational land use area would comprise 48 acres, and include a small campus complex in the cantonment that was formerly used for community service and retail activities.

- Commercial land uses would decrease by 20 acres as a result of converting existing administrative, community service, and retail facilities to public facilities/recreation areas.

- The residential area would decrease by 294 acres as a result of converting base housing areas to public facilities/recreation and institutional (education).

- The public facilities/recreation land use areas would increase by 2,219 acres through conversion of developed areas, especially the airfield, landfill, and grenade range, for public facilities/ recreational uses.

The proposed land uses would generally be compatible with one another, except where the proposed commercial office and retail area adjoins industrial development, presenting potential noise, safety, traffic, and air quality impacts and concerns. This planning choice was made to maintain the existing land use pattern and optimize use of existing facilities.

Any dredging, filling, or construction of a permanent structure below the ordinary high water mark of Van Etten Lake or any dredging within 500 feet of Van Etten Lake would require a permit from the MDNR under Michigan's Inland Lakes and Streams Act (Public Act 346, 1972).

Aesthetics. Under the Recreation Alternative, the proposed decommissioning and demolition of more than half of the base facilities would substantially alter the visual character of the area. With appropriate planning, design, and implementation of these changes, the overall character of the region could be enhanced. Areas of medium sensitivity, including the forested tract in the northwest quadrant of the base, would be improved by careful reclamation of the remaining landscape. To help maintain its aesthetic character, the Au Sable River corridor would remain well separated

from all nonresidential land use by a large, partially reclaimed open space/recreation buffer area.

More intensive use of existing facilities adjacent to or visible from County Road F-41 and the addition of parking lots and/or structures could alter or obstruct view into these areas. Demolition of facilities could increase vistas of forest and open space.

Mitigation Measures. The mitigation measures to revise the Township of Oscoda zoning ordinance would be the same as under the Fire Training Alternative. Mitigation could include the development and implementation of an overall reuse plan that is sensitive to, and seeks to reduce, the perceived environmental disruption of widespread demolition. The plan could include provisions for a logical and orderly sequence of demolition and reclamation, to ensure comprehensive restoration of the landscape and for contracting and monitoring requirements of reclamation efforts.

Minor land use conflicts within the cantonment could be mitigated by application of key design elements, including landscape screening, building access orientation, and street system layout and design.

4.2.2.4 No-Action Alternative

Land Use. The No-Action Alternative would cause no physical changes in on-base land use from conditions at closure. Functionally, there would be no use of base land and facilities. Caretaker personnel would continue to maintain the buildings and grounds. Keeping the base closed, however, would be inconsistent with state and local plans for reuse.

Aesthetics. The No-Action Alternative would have little effect on the visual and aesthetic quality of the base or the surrounding area. The absence of activity on the base could enhance and accelerate the return to natural conditions in some areas, which could contribute positively to the aesthetic quality of those areas. Some landscaped portions of the base would receive less intensive maintenance.

4.2.2.5 Other Land Use Concepts. Impacts of the Advanced Environmental Technology Facility have been evaluated for compatibility with land use plans and regulations, impacts to on- and off-base land uses, and general land use trends in the region.

Land Use. This proposal would be compatible with all other reuse plans because it would be located in a proposed industrial land use area. This proposal would generally be compatible with surrounding land uses.

Aesthetics. This land use concept would be visually compatible with adjacent development.

4.2.3 Transportation

The effects of the Proposed Action and alternatives on each component of the transportation system, including roadways, airspace and air traffic, and other modes of transportation, are presented in this section. Possible mitigation measures are discussed for those components likely to experience substantial impacts under the Proposed Action or any alternative.

Roadways. Reuse-related effects on roadway traffic were assessed by estimating the number of trips generated by each land use, considering employees, visitors, residents, and service vehicles associated with construction and all other on-site activities for the Proposed Action and each alternative. Principal trip-generating land uses included industrial, office, commercial, recreational, residential, and airport uses. These trips were distributed to the roadway system based on proposed land uses and existing travel patterns. This analysis is based on the peak-hour trips as distributed, data on roadway capacities, traffic volumes, and standards established by state and local transportation agencies (Michigan Department of Transportation, 1990, 1991, 1992b; Iosco County Road Commission, 1992). Vehicle trip generation for each reuse alternative and for a variety of land uses has been analyzed and quantified. Based on the reuse development schedule for each land use, the variation in vehicle trips generated by the on-site activities has been determined for the average week day and for the morning and afternoon peak hours.

The distribution of trips to and from the site is based on existing travel patterns for commuters and on the locations of residences of base personnel as obtained from zip code data. It was assumed that the residential choices of the project-related employees would correspond to those of the current base personnel. The resulting peak-hour volumes from the project were then added to the July peak hour of non-project-generated traffic (background) projected under post-closure baseline conditions. Future traffic in the area was projected using average population growth rates during the period of analysis, and applied to all of the existing traffic movements and volumes on key roads.

Traffic impacts were determined based on LOS changes for each of the key roads. Intersections along key roads that would experience heavy traffic were examined for deficiencies. Details on reuse are not sufficiently developed to permit an in-depth evaluation of intersection capacities.

Airspace/Air Traffic. The airspace analysis examined the type and level of aircraft operations projected for the Proposed Action and alternatives and compared them to the airspace configuration and use under the preclosure reference. The impact analysis considered the relationship of the projected aircraft operations to the operational capacity of the airport, using criteria established by the FAA for determining airport service volumes. Potential

effects on airspace use were assessed based on the extent to which the Proposed Action or alternatives could (1) require modifications to the airspace structure or ATC systems and/or facilities; (2) restrict, limit, or otherwise delay other air traffic in the region; or (3) encroach on other airspace areas and uses.

The FAA is ultimately responsible for evaluating the specific effects that the reuse of an airport will have on the safe and efficient use of navigable airspace by aircraft. Such a study is based on details from the airport proponent's ALP and consists of an airspace analysis, a flight safety review, and a review of the potential effect of the proposal on ATC and air navigational facilities. Once this study is completed, the FAA can then determine the actual requirements for facilities, terminal and en route airspace, and instrument flight procedures.

Other Transportation Modes. Because neither the Proposed Action nor any of the alternatives assumes direct use of local railroads or waterways, direct effects on rail and waterway transport are expected to be minimal.

4.2.3.1 *Proposed Action*

Roadways. Traffic generated as a result of the Proposed Action land use changes and direct employment is estimated to be 29,600 vehicles per day for a typical weekday by the year 2013 (Table 4.2-1). These trips include construction activity and pass-by trips created by land use activity. The projected afternoon peak hour would amount to 3,050 vehicles, which represent a little more than 10 percent of the total number of daily trips. The morning peak hour would amount to 2,650 vehicles, which represents a little less than 9 percent of the total ADT. Based on the proposed redevelopment schedule, the traffic generated by the Proposed Action would increase steadily during the 20-year study period.

Table 4.2-1 Average Daily Trip Generation

	1998	2003	2013
Proposed Action	17,000	25,600	29,600
Fire Training Alternative	16,900	21,900	26,100
Recreation Alternative	12,700	16,600	21,000
No-Action Alternative	500	500	500

Notes: Daily trips shown are defined as one-way vehicle trips. All values are rounded to the *nearest* 100.

The Proposed Action includes six access points to the site. However, most traffic generated by the proposed development would use only three access points: the existing access at the Main Gate, the proposed access aligned

with Arrow Street, and the proposed northern access aligned with Van Etten Street. The Capehart Gate to the housing area would provide the main access to the residential area and to the recreational vehicle park. The segment of County Road F-41 between these access points would experience an appreciable amount of traffic throughout the day, with numerous left turns entering the site during the morning peak hour and numerous right turns leaving the site during the afternoon peak hour.

Table 4.2-2 presents the projected peak-hour traffic for closure (1993), 1998, 2003, and 2013 for key local roads, and the associated LOS that would result under the Proposed Action. By 2013, the Proposed Action would add 250 to 950 vehicles along segments of County Road F-41, and up to 700 vehicles on Cedar Lake Road during the peak hour. Fewer than 500 vehicles would be added to other key local roads during the peak hour.

Table 4.2-2. July Peak-Hour Traffic Volumes - Proposed Action

Road	Capacity	1993	1998	2003	2013	LOS in 2013
U.S. 23	3,300	2,600	3,400	3,900	4,500	F
County Road F-41 (Cedar Lake Road to Skeel Avenue)	5,500	400	1,500	2,050	2,350	B
County Road F-41 (Skeel Avenue to Rea Road)	2,500	300	1,000	1,400	1,600	D
Cedar Lake Road	2,500	250	700	900	1,000	D
Loud Road	2,500	100	300	400	450	B
River Road	2,500	200	400	550	600	B
Rea Road	2,500	150	200	250	300	A
Bissonnette Road	2,500	150	200	250	300	A

By the year 1998, the LOS at the intersection of U.S. 23 and County Road F-41 would deteriorate to the preclosure condition of F; other segments along U.S. 23 would continue to operate at LOS E or better. By 2013, LOS on all segments of U.S. 23 within Oscoda and Au Sable would have dropped to E or F. Although MDOT is considering improvements along segments of U.S. 23 south of Au Sable and Oscoda, there are currently no plans to improve segments of this highway within these communities. Throughout the 20-year period of analysis, all other key local roads would operate at LOS D or better. The intersections of County Road F-41 between Skeel Avenue and Rea Road are likely to experience numerous left- and right-turn

movements during peak hours and by 1998 the LOS along that segment of County Road F-41 would drop to D.

The Proposed Action assumes that existing on-base roads would be used during the construction period, but eventually the on-base network would be upgraded where local development plans dictate a need based on community standards for acceptable LOS.

The implementation of the Proposed Action could increase ridership on the local bus system (Iosco Transit Corporation); however, the projected effects would be minimal.

Airspace/Air Traffic. The Proposed Action would include large aircraft maintenance and refurbishment and general aviation activities. Because the volume of flight operations that would occur at the base would be quite low compared to preclosure, the airport's ATC tower and RAPCON would be decommissioned. As a result of the loss of these services, the airport traffic area and control zone associated with the base would also be decommissioned. The airspace in the vicinity of the base would revert back to uncontrolled airspace.

Although IFR radar coverage will be lost when the RAPCON is decommissioned, no impacts are anticipated due to the very low volume of aircraft activity in the Wurtsmith AFB area. Communication at the base between aircraft would be conducted on a common frequency (UNICOM). This is the standard procedure for communication at uncontrolled airports in the United States.

Iosco County Airport would remain open and all airspace and instrument approach procedures related to that airport would continue as previously. There would be no airspace or air traffic impacts.

Based on FAA guidelines, Wurtsmith AFB can accommodate approximately 200,000 aircraft operations a year. By 2013, the operations projected for the Proposed Action would account for slightly more than 10 percent of the total capacity; therefore, no additional runways would be required.

Air Transportation. The Proposed Action does not assume any passenger activity at Wurtsmith AFB during the planning period. Air travelers in the region would continue to utilize the services available at the Alpena and Tri-City airports. These airports would not realize a measurable decrease in passenger traffic as a result of base closure. Aviation traffic currently being conducted at Iosco County Airport would continue.

Mitigation Measures. Improvements to U.S. 23 in Oscoda and Au Sable would be required to preclude some segments from dropping to LOS F. Suggested improvements could include control of access and intersection

upgrades to raise the LOS to a level consistent with transportation planning criteria.

4.2.3.2 Fire Training Alternative

Roadways. Traffic generated as a result of this alternative's land use changes and direct employment is estimated at 26,100 vehicles per day by 2013 (see Table 4.2-1). These trips include construction activity and pass-by trips created by land use activity. The project is expected to add 2,450 vehicles during the afternoon peak hour and 1,800 vehicles during the morning peak hour.

The Fire Training Alternative includes six access points to the site. Five are identical to those for the Proposed Action: Main Gate, Capehart Gate, Arrow Street, Van Etten Street, and from County Road F-41 near the alert area. The sixth access is on Rea Road in the far western section of the base. As for the Proposed Action, most traffic entering or leaving the base would use three access points on County Road F-41 at the Main Gate, Arrow Street, and Van Etten Street. The existing Capehart Gate would provide access to the residential area. The trip distribution to various access points is similar to that assumed for the Proposed Action.

Table 4.2-3 presents the projected peak-hour traffic for closure (1993), 1998, 2003, and 2013 for key local roads, and the associated LOS that would result under the Fire Training Alternative. By 2013, this alternative would add 200 to 850 vehicles along segments of U.S. 23, 1,050 to 1,700 vehicles along segments of County Road F-41, and up to 650 vehicles on Cedar Lake Road during the peak hour. Fewer than 300 vehicles would be added to other key local roads during the peak hour.

Table 4.2-3. July Peak-Hour Traffic Volumes - Fire Training Alternative

Road	Capacity	1993	1998	2003	2013	LOS in 2013
U.S. 23	3,300	2,600	3,400	3,800	4,400	F
County Road F-41 (Cedar Lake Road to Skeel Avenue)	5,500	400	1,500	1,800	2,150	B
County Road F-41 (Skeel Avenue to Rea Road)	2,500	300	1,000	1,250	1,450	D
Cedar Lake Road	2,500	250	700	800	950	C
Loud Road	2,500	100	300	350	400	B
River Road	2,500	200	400	500	600	B
Rea Road	2,500	150	200	250	300	A
Bissonnette Road	2,500	150	200	250	250	A

By 1998, the LOS along some segments of U.S. 23 would deteriorate to the preclosure condition of F; other segments along this highway would continue to operate at LOS E or better. By 2013, LOS on all segments of U.S. 23 within Oscoda and Au Sable would have dropped to E or F. Although MDOT is considering improvements along segments of U.S. 23 south of Au Sable and Oscoda, there are currently no plans to improve segments of this highway within these communities. Throughout the 20-year period of analysis, all other key local roads would operate at LOS D or better. As under the Proposed Action, the intersections on County Road F-41 between Skeel Avenue and Rea Road would experience numerous left- and right-turn movements during peak hours and by 1998 the LOS along this segment of County Road F-41 would drop to D.

The Fire Training Alternative assumes that existing on-base roads would be used during the construction period, but eventually the on-base network would be upgraded as needed to meet community standards for acceptable LOS.

The implementation of the Fire Training Alternative could result in a minimal increase in ridership on the local bus system (Iosco Transit Corporation).

Airspace/Air Traffic. Under this alternative the base would have no aviation reuse component. As a result, all existing navigational aids, airspace, and air traffic services associated with the base would be discontinued. Operations at Iosco County Airport would continue. Although IFR radar coverage will be lost due to the decommissioning of the RAPCON, no impacts are anticipated due to the very low volume of aircraft movements in the Wurtsmith area. No airspace or air traffic impacts would result from closure of the base.

Air Transportation. There would be no impact to the region's air transportation under the Fire Training Alternative.

Mitigation Measures. Recommended improvements to U.S. 23 in Oscoda and Au Sable adjacent to the base would be the same as discussed for the Proposed Action.

4.2.3.3 Recreation Alternative

Roadways. Traffic generated under the Recreation Alternative as a result of proposed land use changes and direct employment is estimated at 21,000 vehicles per day by 2013 (see Table 4.2-1). The project is expected to add 2,000 vehicles during the afternoon peak hour and 1,420 vehicles to the morning peak hour. Based on the proposed development schedule, the traffic generated by the Recreation Alternative would increase steadily during the 20-year study period.

The Recreation Alternative includes six access points to the site, identical to those described for the Fire Training Alternative. Trip distribution and assignment to various access points would be the same as those assumed for the Fire Training Alternative. The access points at Arrow Street and the Main Gate would likely experience the greatest percentage of trips.

Table 4.2-4 presents the projected peak-hour traffic for closure (1993), 1998, 2003, and 2013 for key local roads, and the associated LOS that would result under the Recreation Alternative. By 2013, this alternative would add 200 to 700 vehicles along segments of U.S. 23, 900 to 1,450 vehicles along segments of County Road F-41, and up to 550 vehicles on Cedar Lake Road during the peak hour. Fewer than 350 vehicles would be added to other key local roads during the peak hour.

Table 4.2-4. July Peak-Hour Traffic Volumes - Recreation Alternative

Road	Capacity	1993	1998	2003	2013	LOS in 2013
U.S. 23	3,300	2,600	3,300	3,700	4,300	F
County Road F-41 (Cedar Lake Road to Skeel Avenue)	5,500	400	1,250	1,550	1,900	B
County Road F-41 (Skeel Avenue to Rea Road)	2,500	300	900	1,050	1,300	D
Cedar Lake Road	2,500	250	600	700	850	C
Loud Road	2,500	100	250	300	350	B
River Road	2,500	200	400	450	550	B
Rea Road	2,500	150	200	250	250	A
Bissonnette Road	2,500	150	200	200	250	A

By the year 1998, the LOS along some segments of U.S. 23 would deteriorate to the preclosure condition of F; other segments along this highway would continue to operate at LOS E or better. By 2013, LOS on all segments of U.S. 23 within Oscoda and Au Sable would have dropped to E or F. Although MDOT is considering improvements along segments of U.S. 23 south of Au Sable and Oscoda, there are currently no plans to improve segments of this highway within these communities. Throughout the 20-year period of analysis, all other key local roads would operate at LOS D or better. As under the Proposed Action, the intersections on County Road F-41 between Skeel Avenue and Rea Road would experience numerous left- and right-turn movements during peak hours, and by 1998 the LOS along this segment of County Road F-41 would drop to D.

The Recreation Alternative assumes that existing on-base roads would be used during the construction period, but eventually the on-base network would be upgraded as needed to community standards for acceptable LOS.

The implementation of the Recreation Alternative could result in a minimal increase in ridership on the local bus system (Iosco Transit Corporation).

Airspace/Air Traffic. This alternative does not include any aviation reuse. As such, all airspace impacts and air traffic procedures would be the same as described in the Fire Training Alternative. Operations at Iosco County Airport would continue as previously.

Air Transportation. There would be no impact to the region's air transportation under the Recreation Alternative.

Mitigation Measures. Recommended improvements to U.S. 23 in Oscoda and Au Sable adjacent to the base would be the same as those discussed for the Proposed Action.

4.2.3.4 No-Action Alternative

Roadways. Under the No-Action Alternative, the expected population growth and development unrelated to reuse of Wurtsmith AFB would lead to traffic volume increases on local roadways through the year 2013. It is projected that traffic on the key local roads would increase in proportion to the area's population growth, plus the traffic generated by the OL.

Under the No-Action Alternative, segments of U.S. 23 in Oscoda and Au Sable would operate at LOS E by 2003 and continue to deteriorate thereafter. By 2013, U.S. 23 at County Road F-41 would operate at LOS F, compared to level E at closure. Key local roads would experience a net reduction in traffic volume and would operate at LOS B or better throughout the analysis period. The only traffic on base would be generated by the OL and all on-base roads would operate at LOS A.

Airspace/Air Traffic. Cessation of all air operations at Wurtsmith AFB and the decommissioning of the navigational equipment would have the same effects on airspace in the ROI as discussed for the Fire Training and Recreation alternatives.

Air Transportation. There would be no impact to air transportation under the No-Action Alternative.

4.2.3.5 Other Land Use Concepts. The Advanced Environmental Technology Facility would result in little net change in total trips generated under the Proposed Action or alternatives. This use, in general, would not measurably affect airspace, air transportation, or rail transportation.

4.2.4 Utilities

Direct and indirect changes in future utility demand for each alternative were estimated based on historic, preclosure, and per-capita average daily use on Wurtsmith AFB and in nearby communities. These factors were applied to projections of numbers of future residents and employees associated with each of the alternatives. No-Action Alternative projections generally reflect the change expected in utility usage without redevelopment of the base, and are estimated based on projected population changes and per-capita use. Population projections for Iosco County indicate a slight decline from 2003 to 2013 under the No-Action Alternative, and this decline is reflected in the utility projections for that alternative. The projections for the other alternatives reflect the anticipated growth due to base reuse. Effects of reuse on utility systems were assessed by comparing projected demand under the reuse alternatives to capacity and to projected demand under the No-Action Alternative for each period of analysis (1998, 2003, 2013).

The following assumptions were made in the analysis of potential effects on utilities:

- The site would be serviced by local utility providers.
- The existing distribution/collection systems would be available in their current conditions for reuse.
- Wells on base would be available in the short term to provide water for reuse activities.

The Proposed Action and alternatives would require some changes to the on-base utility systems. Specifically:

- Connections to the Oscoda water supply system may be required. The Michigan Department of Public Health has indicated that on-base wells could be used in the short-term but, because of concerns about migration of contaminated groundwater, reusers would have to find another source of water to supply long-term needs. Local communities are exploring several options for meeting long-term water supply needs, including connection to the plant at Tawas Point, which draws water from Lake Huron. (Groundwater availability and quality and other water supply issues are discussed in Section 4.4.2, Water Resources.)
- Oscoda Township is pursuing funding to connect the on-base sewage collection system to the Oscoda WWTP. It is assumed that reusers of the base property would continue to use the base sanitary sewer system under a Groundwater Discharge Permit with a waiver from the MDNR until the connection to the Oscoda WWTP is completed and in operation. During that

period, some modifications to the base system may be required to adjust for low flow conditions. Until the connection to the Oscoda WWTP is established, monitoring downgradient of the on-base lagoons may be required to ensure that contaminant levels do not exceed regulatory standards. Upgrades to the Oscoda WWTP would be required over the 20-year analysis period to accommodate increased flows generated by the in-migrating population as redevelopment of the base property progresses. Industrial users may have to provide pretreatment of industrial wastewaters.

- In July 1992, the Iosco County Board of Commissioners signed an agreement that would allow trash haulers from Iosco County to use the Crawford-Otsego County landfill. Use of this landfill could increase the lifespan of the Pinconning landfill.

- Individual metering of facilities, improvements to the distribution systems, and appropriate utility corridors and easements would be required for the electrical and gas systems.

4.2.4.1 Proposed Action. Table 4.2-5 summarizes the projected utility demands under the Proposed Action at 5, 10, and 20 years after closure. Demand would be 57 to 92 percent greater under this alternative than under No-Action Alternative conditions. Projected utility demands in the year 2013 would be less than or approximately equal to preclosure (1990) demands, and within the capacity of existing utility systems.

On-site water demand in the year 2013 would be 0.5 MGD, less than 1990 base demands, and within the 2.2-MGD capacity of existing on-base wells.

There would be no environmental impacts associated with utility systems and no mitigations would be required.

4.2.4.2 Fire Training Alternative. Table 4.2-5 summarizes the projected utility demands under the Fire Training Alternative at 5, 10, and 20 years after closure. Demand would be 32 to 53 percent greater under this alternative than under No-Action Alternative conditions, and less than projected demands under the Proposed Action. There would be no environmental impacts associated with utility systems and no mitigations would be required.

4.2.4.3 Recreation Alternative. Table 4.2-5 summarizes the projected utility demands under the Recreation Alternative at 5, 10, and 20 years after closure. Demand would be 20 to 31 percent greater under this alternative than under No-Action Alternative conditions, and less than projected demands under the Proposed Action or Fire Training Alternative. There would be no environmental impacts associated with utility systems and no mitigations would be required.

Table 4.2-5. Total Projected Utility Demand[a]

	1998	Percent Change[b]	2003	Percent Change[b]	2013	Percent Change[b]
Water Demand (MGD)						
No-Action[c] Alternative	1.44		1.44		1.43	
Proposed Action	1.92	33	2.04	42	2.24	57
Fire Training Alternative	1.65	15	1.76	22	1.89	32
Recreation Alternative	1.54	7	1.61	12	1.71	20
Wastewater (MGD)						
No-Action[c] Alternative	1.16		1.16		1.15	
Proposed Action	1.56	34	1.66	43	1.82	58
Fire Training Alternative	1.33	15	1.42	22	1.53	33
Recreation Alternative	1.24	7	1.30	12	1.38	20
Solid Waste (tons/day)						
No-Action[c] Alternative	20.5		20.5		20.4	
Proposed Action	30.1	47	32.4	58	36.4	78
Fire Training Alternative	24.7	20	26.8	31	29.6	45
Recreation Alternative	22.4	9	23.9	17	25.9	27
Electricity (MWH/day)						
No-Action[c] Alternative	87.5		87.5		87.1	
Proposed Action	135.8	55	147.5	69	167.6	92
Fire Training Alternative	108.4	24	119.3	36	133.1	53
Recreation Alternative	97.2	11	104.6	20	114.5	31
Natural Gas (thousand therms/day)						
No-Action[c] Alternative	18.1		18.1		18.1	
Proposed Action	25.0	38	26.6	47	29.5	63
Fire Training	21.1	17	22.6	25	24.6	36
Recreation Alternative	19.5	8	20.6	14	22.0	22

Notes: (a) Values for Proposed Action and reuse alternatives represent total projected demand in the service area for each utility.

(b) Represents percent change from utility consumption without reuse projected for that year.

(c) Represents total demand forecasted for the service area for the years indicated, based on projected changes in population and per capita use, and data from local utility purveyors.

4.2.4.4 No-Action Alternative. Projected utility demand under the No-Action Alternative is presented in Table 4.2-5. Over the 20-year analysis period, utility usage would decline slightly as a result of the projected decline in population in Iosco County and the communities adjacent to the base.

Utility usage on site would be minimal in comparison to the Proposed Action and other alternatives. The disuse of utility systems, however, could result in their degradation over the long term. The small volume of wastewater that would be generated under the No-Action Alternative would make operation of the existing wastewater treatment system uneconomical. A small, on-site system would likely be used to support OL activities, and the existing wastewater lagoons would be closed in accordance with applicable state regulations.

4.2.4.5 Other Land Use Concepts. Establishment of the Advanced Environmental Technology Facility would result in a very small (less than 1 percent) increase in population in the ROI, and so there would be little net change in utility demand.

4.3 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

This section addresses the potential impacts of existing contaminated sites on the various reuse options, and the potential for environmental impacts caused by hazardous materials/waste management practices associated with the reuse options. Hazardous materials/wastes, IRP sites, storage tanks, asbestos, pesticides, PCBs, radon, medical/biohazardous wastes, and ordnance will be discussed within this section. The issue of lead contamination associated with the small arms range is addressed under the IRP.

The U.S. Air Force is committed to the remediation of all contamination at Wurtsmith AFB due to past Air Force activities. The OL will remain after base closure to coordinate remediation activities. Delays or restrictions in disposal and reuse of property may occur due to the extent of contamination and the results of both the risk assessment and remedial designs determined for contaminated sites. Examples of conditions resulting in land use restrictions would be the capping of landfills and the constraints from methane generation and cap integrity, as well as the location of long-term monitoring wells. These conditions would have to be considered in the layout of future development. Options to recipients include creation of parks, greenbelts, or open spaces over these areas.

Regulatory standards and guidelines have been applied in determining the impacts caused by hazardous materials/waste. The following criteria were used to identify potential impacts:

- Accidental release of friable asbestos during the demolition or modification of a structure

- Generation of 100 kilograms (or more) of hazardous waste in a calendar month, resulting in increased regulatory requirements under MERA 307

- New operational requirements or service for all UST and tank systems

- Any spill or release of a reportable quantity of a hazardous material

- Manufacturing of any compound that requires notifying the pertinent regulatory agency

- Exposure of the environment or public to any hazardous material through release or disposal practices.

4.3.1 Proposed Action

4.3.1.1 Hazardous Materials Management. The hazardous materials likely to be utilized for activities occupying the proposed land use zones are identified in Table 4.3-1. The types of hazardous materials used would be similar to those used by the base prior to closure. The quantity of hazardous materials utilized under the Proposed Action would increase over No-Action Alternative conditions due to the increase in reuse activities associated with all land uses. Specific chemical compositions and exact use rates under the Proposed Action are not now known.

If the Proposed Action were implemented, each separate organization would be responsible for the management of hazardous materials according to applicable regulations. Additionally, each organization would have to comply with SARA, Section 311, Title III, which requires that local communities be informed of the use of hazardous materials.

4.3.1.2 Hazardous Waste Management. Under the Proposed Action hazardous wastes generated would consist of waste oils, fuels, solvents, paints, thinners, and heavy metals. These wastes would be generated from the hazardous materials and the processes implemented under this reuse proposal. The quantity of wastes generated would be greater than those produced under the No-Action Alternative due to increased reuse activities.

Upon disposal of parcels, hazardous waste management would become the responsibility of the recipients. Once these responsibilities are allocated to individual organizations, proficiency with those materials and spill responses is required by OSHA regulations (29 CFR). Mutual aid agreements with surrounding communities may require additional scrutiny and training of

Table 4.3-1. Hazardous Material Usage by Land Use - Proposed Action

Land Use	Operation Process	Hazardous Materials
Airfield	Aircraft refueling; utilization of Control Zones, runways, taxiways, corporate and private aviation facilities, aircraft parking	Aviation fuels, glycols, heating oils
Aviation support	Operations associated with aircraft maintenance and manufacturing, air transportation-related industry and warehousing, fire station, other administrative services	Fuels, solvents, paints, POL, hydraulic fluids, degreasers, corrosives, heavy metals, reactives, thinners, paints, glycols, ignitibles, heating oils, cyanides
Industrial	Activities associated with light industry, manufacturing, research and development, warehousing	Solvents, heavy metals, POL, corrosives, catalysts, aerosols, fuels, heating oils, ignitibles, pesticides
Institutional (medical)	Hospital/clinic, dental clinic, x-ray unit	Pharmaceuticals, chemotherapeutic drugs, radiological sources, heavy metals
Commercial	Activities associated with offices, warehousing, retail, service industries, restaurants	Fuels, solvents, corrosives, POL, ignitibles, heating oils, pesticides
Convention/tourist	Activities associated with conventions, including housing and food services, retail, and associated services; community centers	Heating oils, fuels, paint, thinners, POL, fuels, dry-cleaning solvents, aerosols
Residential	Utilization/maintenance of single-family and multi-family units, landscaping	Pesticides, fertilizers, fuels, oils, chlorine, household chemicals
Public facilities/ recreation	Maintenance of existing recreational facilities including indoor and outdoor sports complex, swimming pools, other recreational facilities	Pesticides, fertilizers, chlorine, heating oils, paints, thinners, cleaners, solvents, aerosols, POL
Recreational vehicle park	Maintenance of park facilities and campsites	Pesticides, fuels, oils, solvents, paints, thinners

POL = Petroleum, oil, and lubricants.

emergency staff. The presence of numerous independent owners/operators on the base would change the regulatory requirements and probably increase the regulatory burden relative to hazardous waste management on the base as a whole.

4.3.1.3 Installation Restoration Program Sites. The U.S. Air Force is committed to continue IRP activities under DERP and CERCLA. Groundwater remediation would continue under the Consent Decree

between the U.S. Air Force and the MDNR. After closure, IRP activities will be coordinated by the OL and the aforementioned agencies.

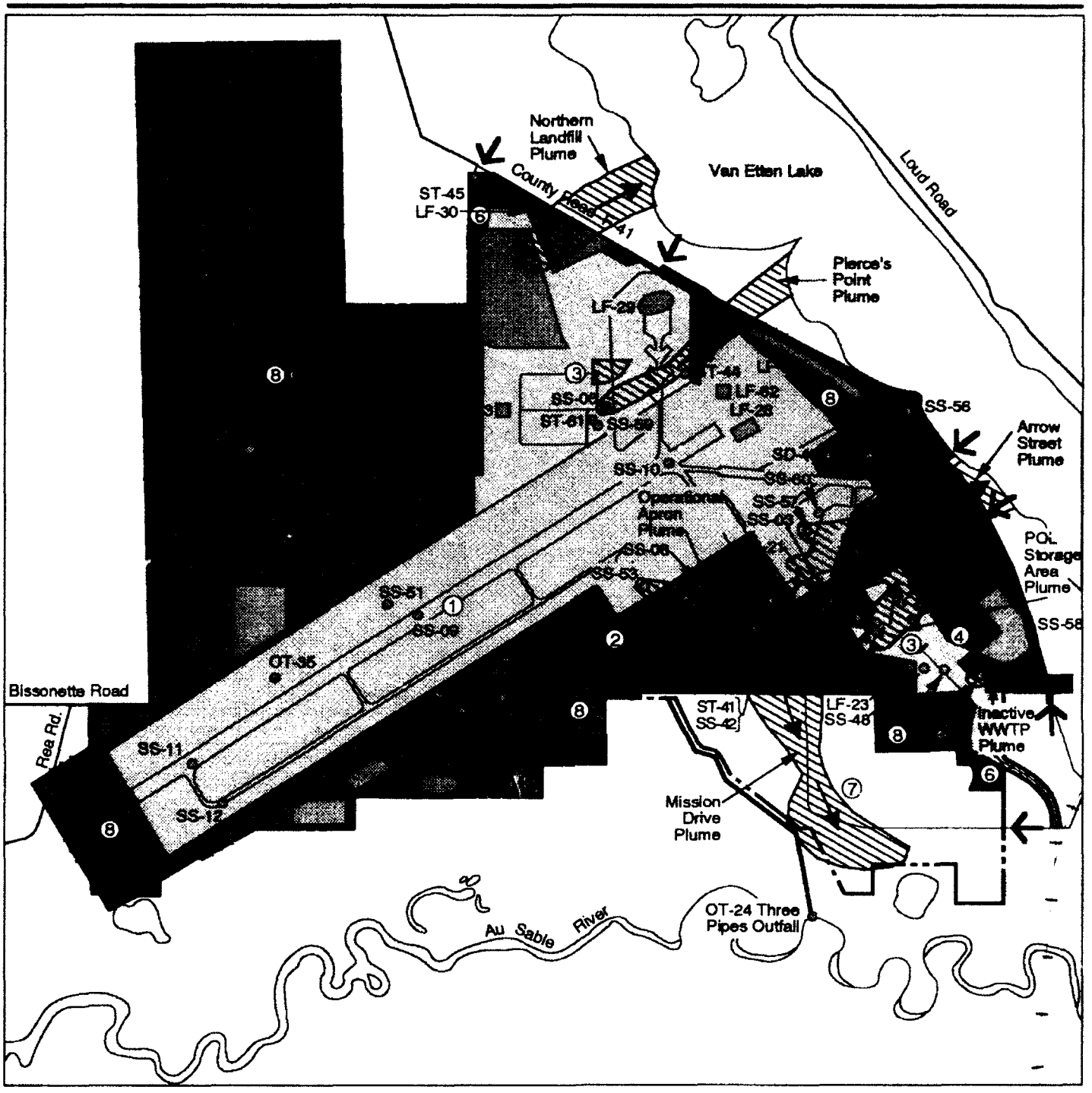
The type of development that is appropriate for property adjacent to or over an IRP site may be limited by the risk to human health and the environment posed by contaminants at the site. For example, residential development over an IRP landfill is generally not appropriate. The risk posed by IRP sites is measured by a risk assessment that analyzes the types of substances present at a site and the potential means by which the public and the environment may be exposed to them. The RD, or blueprint for remediating the IRP site, is based on the results of the risk assessment and the geographical extent of the contamination.

Disposal and reuse of some Wurtsmith AFB properties may be delayed or limited by the extent and type of contamination at IRP sites and by current and future IRP remediation activities (Figure 4.3-1). Based on the results of IRP investigations, the Air Force may, where appropriate, place limits on land reuse through deed restrictions on conveyances and use restrictions on leases. The Air Force may also retain right of access to other properties to inspect monitoring wells or conduct other remedial activities.

The IRP sites within each land use area for the Proposed Action are discussed below and summarized in Table 4.3-2.

Airfield. Spill sites SS-05, SS-09, SS-10, and SS-11 are directly adjacent to the runway, site SS-12 is at the west end of the main taxiway, and site SS-51 is just north of the center of the runway. Preliminary NFADDs have been submitted to the EPA and MDNR for sites SS-09, SS-11, and SS-12; any needed remediation activities associated with these sites may require a short-term shutdown of airfield operations. Remediation of LF-28, LF-62, and OT-35, if required, could cause similar short-term impacts to airfield operations; however, preliminary finished documents for these sites were submitted to MDNR in September 1991 and may become final depending on SI results. Remediation of sites SS-57 and SS-60, adjacent to the operational apron, could cause a short-term disruption or restricted use of the apron areas. Remediation activities and installation of long-term monitoring wells associated with the Arrow Street and Operational Apron plumes should not impact airfield operations. Groundwater contamination caused by SS-53 is being remediated by existing pump and treat systems and should not impact reuse.

Aviation Support. Land use restriction and delays in property disposal may occur to support ongoing as well as future groundwater pump and treat remediation activities of the Arrow Street, Operational Apron, and the Mission Drive plumes. Installation of monitoring wells could also result in land use restrictions. Delays in property disposal could occur due to



EXPLANATION

① Airfield	⑤ Institutional * (Education)	⑧ Public Facilities/ Recreation	Base Boundary		
② Aviation Support	⑥ Commercial	⑧ Recreational Vehicle Park	Access Points		
③ Industrial	⑥ Convention/ Tourist	⑨ Agriculture *	IRP Site		
④ Institutional (Medical)	⑦ Residential	⑩ Vacant Land *	Groundwater Plume		
			Direction of Groundwater Flow		

0 750 1500 3000 Feet

* Not Applicable

IRP Sites - Proposed Action

Figure 4.3-1

Table 4.3-2. IRP Sites within Land Use Areas - Proposed Action

Airfield	LF-28, LF-62, OT-35, SS-09, SS-10, SS-11, SS-12, SS-51, SS-53, SS-57, SS-60, Arrow Street Plume, Operational Apron Plume
Aviation support	FT-01, SD-43, SS-03, SS-08, SS-17, SS-20, SS-21, SS-22, SS-42, SS-54, ST-41, Arrow Street Plume, Mission Drive Plume, Operational Apron Plume
Industrial	LF-23, LF-29, LF-30, LF-31, LF-63, SS-05, SS-06, SS-13, SS-14, SS-19, SS-48, SS-59, ST-40, ST-44, ST-46, ST-61, Inactive WWTP Plume, Northern Landfill Plume, Pierce's Point Plume, POL Storage Area Plume
Institutional (medical)	None
Commercial	Arrow Street Plume, Inactive WWTP Plume, POL Storage Area Plume, SS-52, ST-45
Convention/tourist	SS-47, SS-58, WP-04, Arrow Street Plume, Inactive WWTP Plume, POL Storage Area Plume
Residential	Mission Drive Plume
Public facilities/recreation	FT-02, LF-23, LF-26, LF-27, LF-30, LF-31, OT-16, OT-35, OT-49, SS-55, SS-56, WP-32, WP-33, Fire Training Area Plume, Mission Drive Plume, Northern Landfill Plume, Operational Apron Plume, Pierce's Point Plume
Recreational vehicle park	None

POL = Petroleum, oil, and lubricants.
WWTP = Wastewater treatment plant.

remediation of numerous spill sites, storage tanks, and the inactive fire protection training area (site FT-01) associated with this land use.

Industrial. Remediation activities associated with the seven spill sites in the southern industrial area and sites ST-44 and SS-59 in the northern industrial area could delay disposal, thus delaying reuse. Land use restrictions and property disposal delay could occur due to remediation of LF-29, LF-30, LF-31, and LF-63 in the northern portion of the base and LF-23 in the southeast. Remediation activities of the Inactive WWTP and POL Storage Area plumes in the south and Northern Landfill and Pierce's Point plumes, including sites SS-05 and ST-61, in the north could delay property disposal; installation of groundwater treatment systems could restrict land use.

Institutional (Medical). No IRP sites are located within this land use zone.

Commercial. Remediation of the Arrow Street, POL Storage Area, and Inactive WWTP plumes could involve land use restrictions and delay property disposal. The disposal of the commercial area in the north central portion of

the base could be delayed by remediation of site ST-45, and disposal of the central base commercial area could be delayed by remediation of site SS-52.

Convention/Tourist. Remediation of the base service station (SS-47), the fuel oil USTs associated with SS-58 and the drying beds at site WP-04, all located in the southeastern portion of the base, could delay property disposal at that site. Remediation and monitoring activities associated with the Arrow Street, POL Storage Area, and Inactive WWTP plumes could restrict land use, delaying property disposal.

Residential. Remediation activities and installation of long-term monitoring wells associated with the Mission Drive Plume could result in land use restrictions and could delay some property disposal.

Public Facilities/Recreation. Remediation activities and long-term monitoring associated with the five plumes, as well as the northern landfills, could result in land use restrictions and could delay property disposal. Remediation of the smaller landfills LF-23, LF-26, and LF-27; the EOD (OT-49) and small arms (SS-55) ranges; and sites OT-16, OT-35, FT-02, SS-56, and the wastewater lagoons (WP-32, WP-33) could also delay disposal as well as require land use restrictions.

Recreational Vehicle Park. No IRP sites are associated with this land use.

Determination of future base land uses will be, to a certain extent, dependent upon a regulatory review of the remedial design of the IRP sites. This regulatory review would identify monitoring well locations and future land use limitations as a result of their presence. The regulatory review process would include notifying the FAA concerning the construction and locations of any monitoring wells.

4.3.1.4 Storage Tanks. Flight and maintenance operations under the Proposed Action would require both aboveground tanks and USTs. Reused and new USTs and aboveground storage tanks that would be required by the new owner/operators will be subject to all applicable federal, state, and local regulations. These regulations include acceptable leak detection methodologies, spill and overfill protection, cathodic protection, secondary containment for the tank systems including the piping, and liability insurance. USTs that would not support reuse activities would be removed in conformance with the appropriate federal, state, and local regulations. The fuel hydrant system would be rendered inoperable, removing some sections and filling other less accessible sections (those under aprons and taxiways) with inert materials or other treatment. Oil/water separators would be pumped and cleaned of all wastes prior to disposal of properties. Oil/water separators would also be integrity tested, and those found to be unfit would be closed.

Aboveground fuel storage tanks that would not be initially utilized to support reuse activities would be emptied, purged of fumes to preclude fire hazards, and secured, in accordance with regulations of the Fire Marshal Division of the Michigan State Police. The Fire Marshal Division may also order the removal of tanks that are out of service.

4.3.1.5 Asbestos. Renovation and demolition of existing structures with ACM may occur with reuse development. Such activities would be subject to all applicable federal, state, and local regulations. Therefore, no threat to human health or the environment will result under the Proposed Action.

4.3.1.6 Pesticide Usage. Pesticide use associated with the Proposed Action would be greater than amounts used under No-Action Alternative conditions as a result of the airfield, aviation support, industrial, and commercial reuses. An increase in household pesticide usage over closure conditions would occur due to reuse of on-base housing. Management practices would be subject to FIFRA and state regulations.

4.3.1.7 Polychlorinated Biphenyls. All federally regulated PCB and PCB-contaminated equipment has been removed from Wurtsmith AFB; therefore, these materials will not create any impacts to reuse.

4.3.1.8 Radon. Since all radon screening survey results were below EPA's recommended mitigation level of 4 pCi/l, there would be no impact on reuse activities.

4.3.1.9 Medical/Biohazardous Waste. Biohazardous materials generated with the reuse of the hospital would be subject to conformance with the Michigan Medical Waste Management Act. The generation rates for waste products and disposal requirements would increase over No-Action Alternative conditions as a result of facility reuse. This increase would not represent an appreciable change from waste quantities generated during preclosure, nor represent an impact on this reuse option if managed under all applicable regulations.

4.3.1.10 Ordnance. The EOD range, grenade range, and former ordnance drop zone have been cleared of unexploded ordnance. The earthen berm at the small arms range will be sifted for bullets prior to disposal of that parcel. If the small arms range is reused, the earthen berms surrounding the range could become contaminated with lead from bullets. This would not create an impact to reuse, and should not be an environmental impact if the range is properly maintained and the lead bullets are removed on a regular basis.

4.3.1.11 Mitigation Measures. A cooperative planning body for hazardous materials and waste management could be established with the support of the new individual operators on the base. Establishment of such a body could reduce the costs of environmental compliance training, health and

safety training, and waste management, and could increase recycling, minimize waste, and assist in mutual spill responses.

The scheduling of collection days for hazardous household materials, such as paints, pesticides, and cleaners, could mitigate publicly owned treatment works and storm water discharge concerns. Articles in the local papers and classes offered by community educational programs could increase public awareness on recycling, appropriate use of pesticides, waste minimization, and waste disposal.

All of the IRP sites may not need to be remediated; however, all of them must be addressed and properly closed out. Active coordination between the OL and new construction planning agencies could mitigate potential problems. The presence of IRP sites may limit certain land uses within overlying areas; options could include reuse as open space, greenbelt, or parks. Current and future facilities utilized for pump and treat remediation of groundwater contamination would require access rights-of-way.

Use of USTs that would remain in service would have to be coordinated with planning agencies to preclude construction of facilities that would endanger the integrity of the tanks or piping systems.

Potential impacts from lead-contaminated soils through reuse of the small arms firing range could be mitigated with routine sifting of the earthen berms that surround the range.

Coordination of asbestos removal or management in conjunction with demolition or renovation activities could mitigate environmental releases into the ambient air. Compliance with OSHA would preclude asbestos exposure during renovation and demolition.

4.3.2 Fire Training Alternative

4.3.2.1 Hazardous Materials Management. The types of hazardous materials utilized under this alternative are identified in Table 4.3-3. Materials to be used for training by the fire academy would consist of propane, fuel oil/gasoline mixtures, alcohols, flares, laboratory chemicals, and combustible metals such as magnesium and aluminum. Management of these materials would be the responsibility of the owner/operator and would comply with all applicable federal, state, and local regulations. Some of the materials to be used by the fire training academy were not utilized at Wurtsmith AFB during preclosure conditions; the introduction and management of these materials are not expected to impact reuse. Materials used for grounds and facility maintenance by the fire training academy as well as the other reuse proponents would include heating oil, POL, cleaners, solvents, paints, thinners, and pesticides. The overall quantity of hazardous materials usage would increase over No-Action Alternative conditions due to

Table 4.3-3. Hazardous Material Usage by Land Use - Fire Training Alternative

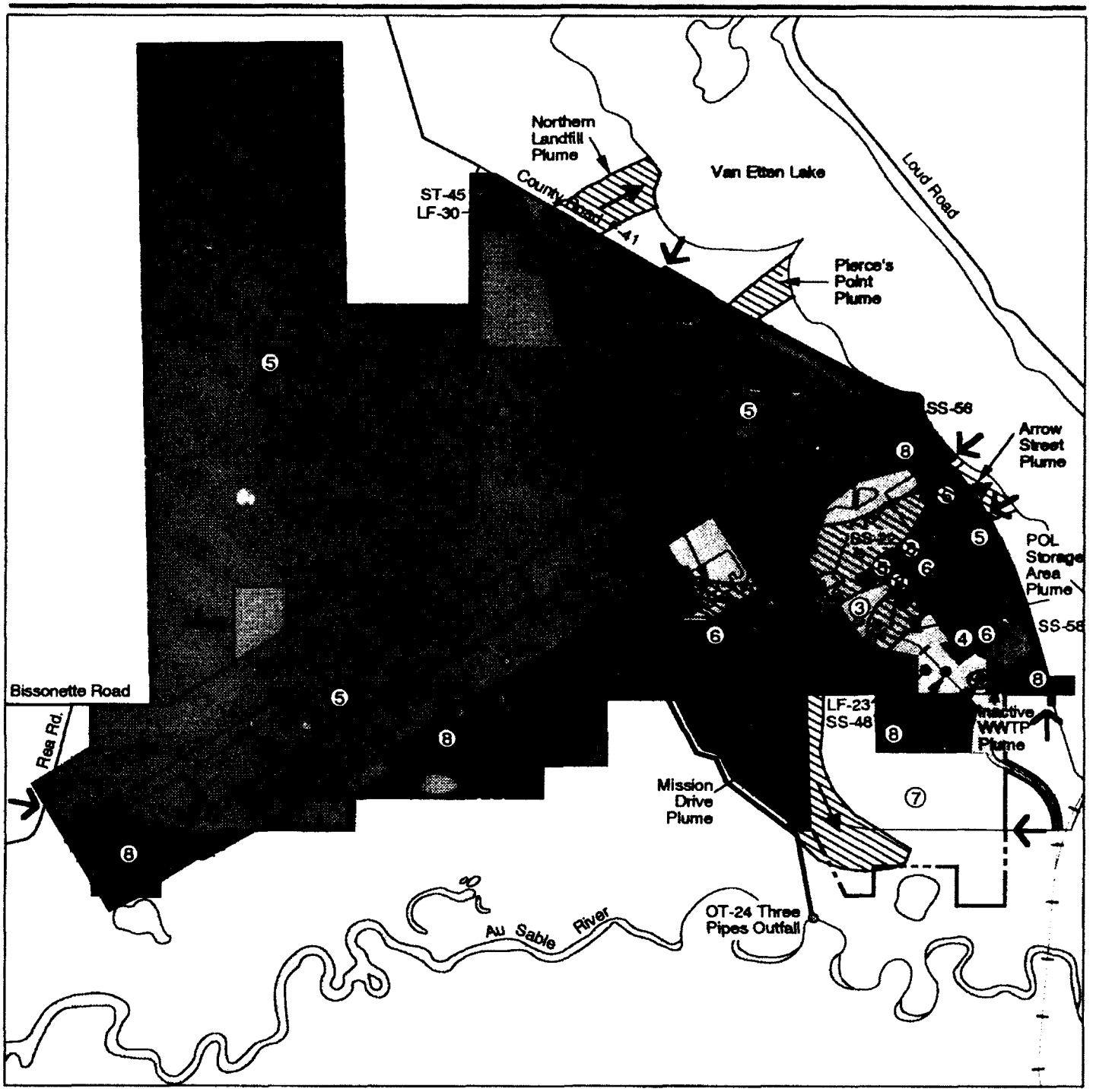
Land Use	Operation Process	Hazardous Materials
Industrial	Activities associated with light industry and manufacturing research and development, warehousing	Solvents, heavy metals, POL, corrosives, catalysts, aerosols, fuels, heating oils, ignitibles, pesticides
Educational (medical)	Hospital/clinic, dental clinic, x-ray unit	Pharmaceuticals, chemotherapeutic drugs, radiological sources, heavy metals
Institutional (educational)	Private/public education, fire training, corporate training facilities, vocational schools, chemistry laboratory	Fuels/fuel oils, flares, propane, solvents, heating oils, solvents, cleaners, pesticides, paints, thinners, fire extinguishing agents, ignitibles, alcohol, magnesium, aluminum
Commercial	Activities associated with offices, retail, service industries, restaurants, convention community center and facilities	Fuels, solvents, corrosives, POL, ignitibles, heating oils, pesticides
Residential	Utilization/maintenance of single-family and multi-family units, landscaping	Pesticides, fertilizers, fuels, oils, household chemicals
Public facilities/ recreation	Maintenance of existing recreational facilities including golf course, sports complex, swimming pools, other recreational facilities	Pesticides, fertilizers, chlorine, heating oils, paints, thinners, cleaners, solvents, aerosols, POL

POL = Petroleum, oil, and lubricants.

an increase in reuse activities, but should not impact reuse if properly managed.

4.3.2.2 Hazardous Waste Management. Hazardous waste would be generated under the Fire Training Alternative from the hazardous materials and processes utilized, and would consist of solvents, paints, thinners, and waste oils. The fire training academy would generate a large amount of wastewater with fuel/oil, heavy metal, and/or fire extinguishing agent residue. Used fire fighting water would be captured and returned to a retention pond via an oil/water separator. The water collection system and retention pond would be managed in accordance with applicable state permitting and environmental monitoring requirements. Proper disposal of oil/water separator wastes would be the responsibility of the fire training academy.

4.3.2.3 Installation Restoration Program Sites. The IRP sites within each land use area for the Fire Training Alternative are identified in Figure 4.3-2 and summarized in Table 4.3-4.



EXPLANATION

- ① Airfield*
- ② Aviation Support*
- ③ Industrial
- ④ Institutional (Medical)
- ⑤ Institutional (Education)
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public Facilities/ Recreation
- ⑨ Agriculture *
- ⑩ Vacant Land *
- Base Boundary
- Access Points
- IRP Site
- Groundwater Plume
- Direction of Groundwater Flow

0 750 1500 3000 Feet

* Not Applicable

IRP Sites - Fire Training Alternative

Figure 4.3-2

Table 4.3-4. IRP Sites within Land Use Areas - Fire Training Alternative

Industrial	SS-03, SS-06, SS-13, SS-14, SS-17, SS-19, SS-20, SS-21, SS-22, SS-48, SS-52, SS-60, ST-40, ST-46, WP-04, Arrow Street Plume, Inactive WWTP Shop Plume, Operational Apron Plume, POL Storage Area Plume
Institutional (medical)	None
Institutional (educational)	LF-26, LF-28, LF-29, LF-30, LF-31, LF-62, LF-63, OT-35, OT-49, SS-05, SS-08, SS-09, SS-10, SS-11, SS-12, SS-51, SS-53, SS-54, SS-55, SS-59, ST-44, ST-45, ST-61, Arrow Street Plume, Fire Training Area Plume, Northern Landfill Plume, Operational Apron Plume, Pierce's Point Plume, POL Storage Area Plume
Commercial	SS-47, SS-58, Arrow Street Plume, Inactive WWTP Plume, Mission Drive Plume, Operational Apron Plume, POL Storage Area Plume
Residential	Mission Drive Plume
Public facilities/recreation	FT-01, FT-02, LF-23, LF-27, OT-16, SD-43, SS-42, SS-56, SS-57, ST-41, WP-32, WP-33, Arrow Street Plume, Fire Training Area Plume, Mission Drive Plume, Operational Apron Plume, POL Storage Area Plume

POL = Petroleum, oil, and lubricants.
WWTP = Wastewater treatment plant.

Industrial. Present and future groundwater pump and treat facilities, and monitoring well locations for the four plumes in the main base areas could restrict land use and delay property disposal. Remediation activities at the numerous spill sites associated with this land use (see Table 4.3-4) may delay reuse development.

Institutional (Medical). No IRP sites are associated with this land use area.

Institutional (Educational). Installation of groundwater treatment facilities and monitoring wells for the Fire Training Area, Arrow Street, Operational Apron, Pierce's Point, and Northern Landfill plumes could restrict land use and cause some delays in property disposal. Remediation activities associated with all other IRP sites located within the northern educational land use zone (see Table 4.3-4) could restrict land use and delay property disposal. However, these constraints should not impact the reuse of this area as a fire training academy. Reuse in educational areas in the main cantonment area could be delayed due to remediation activities associated with the Arrow Street and POL Storage Area plumes.

Commercial. Land use restrictions and property disposal delays could occur during remediation and monitoring activities of the five plumes under this

land use. Delays in property disposal could result due to remediation of sites SS-47 and SS-58.

Residential. Remediation and long-term monitoring activities associated with the Mission Drive Plume could result in land use restriction and delays in property disposal.

Public Facilities/Recreation. Groundwater remediation activities associated with the Arrow Street and POL Storage Area plumes could delay property disposal as well as restrict recreational uses in the central base areas, adjacent to Arrow Street. Remediation of the five plumes, as well as all other IRP sites including the wastewater lagoons, could delay disposal of some properties and require land use restrictions, but these conditions should not impact the final reuse of these areas.

4.3.2.4 Storage Tanks. Facility and training operations conducted by the fire training academy would require both USTs and aboveground storage tanks. These tanks would be utilized for storage of fuel/oil mixtures which are used as an ignition source, heating oils for the numerous facilities associated with the academy, and POL and motor fuel for fleet maintenance. Additional tanks may be utilized for other reuses under the Fire Training Alternative. Reused and new tanks required by the new owners/operators, including the fire training academy, would be subject to the same federal, state, and local regulations discussed under the Proposed Action.

All USTs and aboveground storage tanks not initially utilized under this alternative would be removed or emptied and secured in compliance with all applicable regulations mentioned under the Proposed Action. All oil/water separators would be closed using the methods discussed for the Proposed Action. The fuel hydrant system would not be utilized and would be rendered inoperable, as discussed for the Proposed Action.

4.3.2.5 Asbestos. The residential units southwest of Perimeter Road and Mission Drive could contain ACM. Demolition planned for any ACM-containing structures would be conducted in accordance with all applicable abatement standards.

4.3.2.6 Pesticide Usage. The amounts of pesticides used in association with the Fire Training Alternative would increase from No-Action Alternative conditions, due mainly to industrial, commercial, and institutional reuses. There would also be some household pesticide use associated with the retained residential area.

4.3.2.7 Polychlorinated Biphenyls. All federally regulated PCB-contaminated equipment has been removed from the base; therefore, no impacts on reuse activities would occur.

4.3.2.8 Radon. Since all screening survey results were below EPA's recommended mitigation level of 4 pCi/l, there would be no impact on reuse activities.

4.3.2.9 Medical/Biohazardous Waste. Impacts from medical/biohazardous wastes under the Fire Training Alternative would be similar to those under the Proposed Action.

4.3.2.10 Ordnance. The EOD range, grenade range, and former ordnance drop zone have been cleared of unexploded ordnance. The earthen berm at the small arms firing range will be sifted prior to property disposal. Therefore, no impacts would occur.

4.3.2.11 Mitigation Measures. Mitigation measures under this alternative would be similar to those under the Proposed Action.

4.3.3 Recreation Alternative

4.3.3.1 Hazardous Materials Management. The types of hazardous materials utilized under the Recreation Alternative are identified in Table 4.3-5. Materials could include heating oils, POL, fuels, paints, thinners, solvents, and pesticides. The quantities of these materials would be greater than those used under the No-Action Alternative due to an increase in reuse activities.

4.3.3.2 Hazardous Waste Management. Under this alternative, hazardous wastes would be generated from the hazardous materials and the various processes utilized, and could include waste oils, solvents, paints, thinners, and heavy metals. The amounts generated under this alternative would be greater than those produced under the No-Action Alternative due to an increase in reuse activities, but considerably less than the quantities generated by the other alternatives.

4.3.3.3 Installation Restoration Program Sites. The IRP sites within each land use area for the Recreation Alternative are identified in Figure 4.3-3, and an inventory of IRP sites is provided in Table 4.3-6.

Industrial. Remediation and monitoring of the six plumes could delay reuse as well as result in land use restrictions. Remediation activities associated with a number of spill sites and leaking USTs in the central base area, WSA, and the operational apron area could delay property disposal.

Institutional (medical). No IRP sites are associated with this land use zone.

Institutional (educational). Remediation and long-term monitoring of the Arrow Street and POL Storage Area plumes could impact reuse, through land use restrictions and delays in property disposal.

Table 4.3-5. Hazardous Material Usage by Land Use - Recreation Alternative

Land Use	Operation Process	Hazardous Materials
Industrial	Activities associated with light industry and manufacturing research and development, warehousing	Solvents, heavy metals, POL, corrosives, catalysts, aerosols, fuels, heating oils, ignitibles, pesticides
Institutional (medical)	Hospital/clinic, dental clinic, x-ray	Pharmaceutical, chemotherapeutic drugs, radiological sources, heavy metals
Institutional (educational)	Private/public education, youth center, corporate training facilities (includes lodging and food services), vocational schools	Corrosives, ignitibles, solvents, heating oils, lubricants, cleaners, pesticides, paints, thinners
Commercial	Activities associated with office park, retail, service industries, restaurants, community facilities	Fuels, solvents, corrosives, POL, ignitibles, heating oils, pesticides,
Residential	Utilization/maintenance of single-family and multi-family units, landscaping	Pesticides, fertilizers, fuels, oils, household chemicals
Public facilities/ recreation	Maintenance of existing recreational facilities including indoor and outdoor sports complex, swimming pools, other recreational facilities	Pesticides, fertilizers, chlorine, heating oils, paints, thinners, cleaners, solvents, aerosols, POL

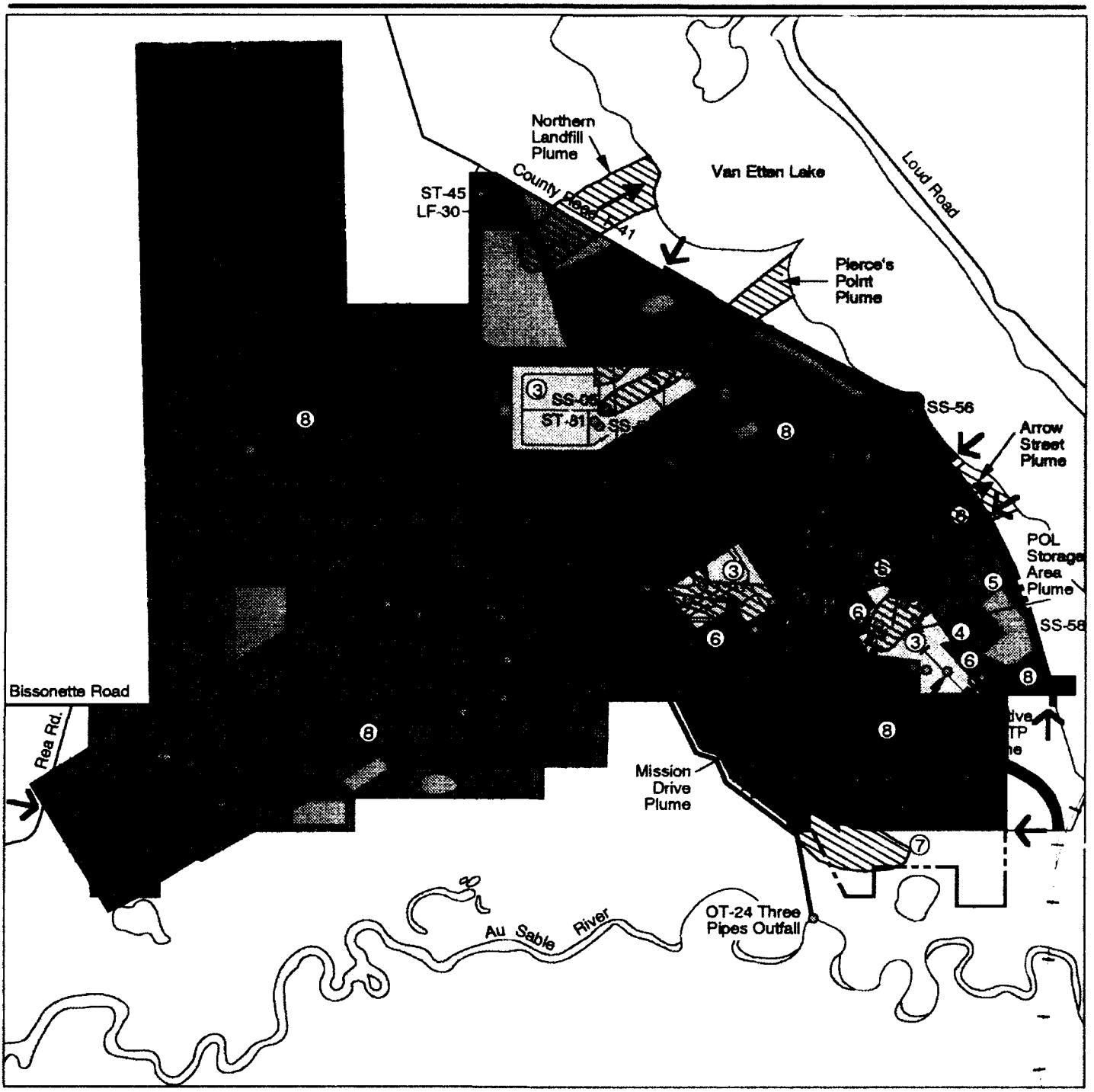
POL = Petroleum, oil and lubricants.

Commercial. Remediation and monitoring activities associated with four plumes under this land use could create delays in reuse and/or restrict land use. Delays in property disposal could result due to remediation of sites SS-47, SS-52, and WP-04.

Residential. Land use restrictions and delays in property disposal could impact this land use area due to groundwater remediation associated with the Mission Drive Plume.

Public Facilities/Recreation. Remediation of all eight plumes on Wurtsmith AFB could cause some property disposal delays, and long-term monitoring would require land use restrictions for property access. Similar impacts would occur during remediation of the nine base landfills and the wastewater treatment lagoons associated with this land use area. Delays in property disposal could occur from remediation activities associated with the fire training sites, the sludge drying areas, and the EOD and small arms ranges, as well as the numerous spill sites and storage tanks (see Table 4.3-6) located within this land use.

Recreational vehicle park. Delays in property disposal could result due to remediation activities associated with sites FT-01, SS-56, and SD-43.



EXPLANATION

- ① Airfield*
- ② Aviation Support*
- ③ Industrial
- ④ Institutional (Medical)
- ⑤ Institutional (Education)
- ⑥ Commercial
- ⑦ Residential
- ⑧ Public Facilities/ Recreation
- ⑧ Recreational Vehicle Park
- ⑨ Agriculture *
- ⑩ Vacant Land *
- IRP Site
- Groundwater Plume
- Direction of Groundwater Flow
- Base Boundary
- Access Points

0 750 1500 3000 Feet

* Not Applicable

IRP Sites - Recreation Alternative

Figure 4.3-3

Table 4.3-6 IRP Sites within Land Use Areas - Recreation Alternative

Industrial	SS-05, SS-06, SS-08, SS-13, SS-14, SS-19, SS-42, SS-48, SS-54, SS-59, ST-40, ST-41, ST-44, ST-46, ST-61, Arrow Street Plume, Inactive WWTP Plume, Mission Drive Plume, Operational Apron Plume, Pierce's Point Plume, POL Storage Area Plume
Institutional (medical)	None
Institutional (educational)	Arrow Street Plume, POL Storage Area Plume
Commercial	SS-20, SS-47, SS-52, WP-04, Arrow Street Plume, Inactive WWTP Plume, Mission Drive Plume, Operational Apron Plume
Residential	Mission Drive Plume
Public facilities/recreation	FT-02, LF-23, LF-26, LF-27, LF-28, LF-29, LF-30, LF-31, LF-62, LF-63, OT-16, OT-35, OT-49, SS-03, SS-09, SS-10, SS-11, SS-12, SS-17, SS-21, SS-22, SS-42, SS-51, SS-53, SS-55, SS-57, SS-58, SS-60, ST-45, WP-32, WP-33, Arrow Street Plume, Fire Training Area Plume, Inactive WWTP Locomotive Shop Mission Drive Plume, Northern Landfill Plume, Operational Apron Plume, Pierce's Point Plume, POL Storage Area Plume
Recreational vehicle park	FT-01, SD-43, SS-56

POL = Petroleum, oil, and lubricants.
WWTP = Wastewater treatment plant.

4.3.3.4 Storage Tanks. Reuse and/or closure of existing USTs and aboveground storage tanks under this alternative would be subject to all applicable regulations mentioned under the Proposed Action. The fuel hydrant system would be rendered inoperable, as discussed for the Proposed Action.

4.3.3.5 Asbestos. The on-base military housing units, as well as other structures, could contain ACM. Renovation or demolition of these structures would be subject to all applicable federal, state, and local regulations.

4.3.3.6 Pesticide Usage. The amounts of pesticides used in association with the Recreation Alternative would be greater than the amounts used under the No-Action Alternative due to the reuse of industrial and institutional facilities. However, the quantities of pesticides that would be used under this alternative would be considerably less than those used under the other alternatives, as a result of restoration and conversion of the airfield area to natural open space, as well as less residential and industrial reuse.

4.3.3.7 Polychlorinated Biphenyls. All federally regulated PCB-contaminated equipment has been removed from the base; therefore, no impacts on reuse activities would occur.

4.3.3.8 Radon. Since all screening survey results were below EPA's recommended mitigation level of 4 pCi/l, there would be no impact on reuse activities.

4.3.3.9 Medical/Biohazardous Waste. Impacts from medical/biohazardous wastes under the Recreation Alternative would be similar to those under the Proposed Action and the Fire Training Alternative.

4.3.3.10 Ordnance. The EOD range, grenade range, and former ordnance drop zone have been cleared of unexploded ordnance. The earthen berm at the small arms range will be sifted prior to property disposal. Therefore, no impacts to reuse activities would occur under this alternative.

4.3.3.11 Mitigation Measures. Mitigation measures under this alternative would be similar to those under the Proposed Action.

4.3.4 No-Action Alternative

Painting and maintenance would be the primary activities under this alternative that would involve hazardous materials. The OL would manage all wastes generated under the applicable regulations as well as the final phases of the IRP activities.

4.3.4.1 Hazardous Materials Management. Hazardous materials would be utilized in preventive and regular maintenance activities, grounds maintenance, and water and wastewater treatment. The materials used for these activities would include pesticides, fuels, paints, and corrosives. The OL would be responsible for hazardous materials handling training, as well as hazardous materials communication requirements of OSHA regulations. Quantities of hazardous materials used would be similar to those used at closure.

4.3.4.2 Hazardous Waste Management. With the exception of facilities utilized by OL personnel, all satellite accumulation points would be closed and the DRMO would dispose of all hazardous waste prior to closure. The small amount of hazardous waste that would be generated under the No-Action Alternative would be equal to that at closure and may enable the OL to become an exempt, small-quantity generator. The OL must comply with all RCRA and state regulations.

4.3.4.3 Installation Restoration Program Sites. Ongoing sampling and remedial design activities would be continued by the individual IRP contractors. The OL would support the utility requirements for these contractors and provide security for the IRP areas. Pump and treat remediation and monitoring of the groundwater contamination would continue and possibly expand in scope. These activities would be supported by the OL.

4.3.4.4 Storage Tanks. USTs remaining at Wurtsmith AFB would be managed by the OL. Cathodic protection and leak detection systems on the USTs would be the responsibility of the OL. Federal and state regulations require the proper closure of USTs out of service for 1 year or longer. The fuel hydrant system would be rendered inoperable, as discussed for the Proposed Action.

The aboveground storage tanks that would not be used to support reuse activities would be emptied, purged of fuel fumes to preclude fire hazards, and secured. The Fire Marshal Division of the Michigan State Police may order the removal of tanks that are out of service. The OL would provide cathodic protection, repair, and general maintenance for the aboveground storage tanks and piping.

4.3.4.5 Asbestos. The impacts from the No-Action Alternative would be minimal. Vacated buildings would be secured to prevent contact with ACM if the No-Action Alternative were implemented. Upon completion of the asbestos survey, management of ACM would be accomplished to ensure a safe site environment.

4.3.4.6 Pesticide Usage. Under the No-Action Alternative, the grounds would be maintained in a manner to facilitate economic resumption of use. There should not be an appreciable increase in the use of pesticides from the closure baseline. Application of pesticides would be conducted in accordance with FIFRA and state regulations to assure the proper and safe handling and application of all chemicals.

4.3.4.7 Polychlorinated Biphenyls. All federally regulated PCB-contaminated equipment has been removed; therefore, these materials would not create any impacts.

4.3.4.8 Radon. Since all radon screening survey results were below EPA's recommended mitigation level of 4 pCi/l, there would be no impacts from implementation of the No-Action Alternative.

4.3.4.9 Medical/Biohazardous Waste. All existing materials will be removed prior to closure; therefore, these materials would not create an impact under the No-Action Alternative.

4.3.4.10 Ordnance. The EOD range, grenade range, and former ordnance drop zone have been cleared of unexploded ordnance, and the earthen berm at the small arms range will be sifted. Therefore no impacts would occur.

4.3.4.11 Mitigation Measures. Under the No-Action Alternative, contingency plans developed to address spill response would be less extensive than those required for the Proposed Action or the other reuse

alternatives. Implementation of such procedures could effectively mitigate any potential impacts associated with the No-Action Alternative.

4.3.5 Other Land Use Concepts

Hazardous materials to be utilized under the Advanced Environmental Technology Facility proposal would be those associated with a small research laboratory. Hazardous wastes generated at this facility would consist of soil and/or water samples taken from various sites. Samples would be analyzed on site and properly disposed of or sent off site for analysis. All hazardous materials and wastes would be managed in accordance with all applicable federal, state, and local regulations by qualified personnel. GLMAC bioremediation activities at identified IRP sites would be coordinated with the OL, including appropriate approvals that may be required from the MDNR. Implementation of this proposal could result in the acceleration of remediation activities at selected IRP sites, which in turn could accelerate disposal of those parcels.

4.4 NATURAL ENVIRONMENT

This section describes the potential environmental effects of the Proposed Action and alternatives on the natural resources of soils and geology, water resources, air quality, noise, biological resources, and cultural resources on the base and in the surrounding region.

4.4.1 Soils and Geology

The potential environmental effects of the Proposed Action and reuse alternatives on the local soils and geology have been analyzed based on review of published literature. Soils and geology would be affected primarily during ground-disturbing activities, when local soil profiles could be altered. Soils in these areas would remain relatively stable in the long term because they would be overlain by facilities or pavement, or managed following SCS recommendations to minimize erosion. Acreages to be disturbed under the three alternatives between closure and 5, 10, and 20 years of redevelopment are presented in Chapter 2. Soil contamination from hazardous material/wastes is discussed in Section 4.3, Hazardous Materials and Hazardous Waste Management.

4.4.1.1 Proposed Action. Effects of the Proposed Action on the regional soils and geology would be minimal, and would result primarily from limited ground disturbance associated with facility construction, renovation, and demolition and infrastructure improvement. These activities could alter the soil profiles and local topography.

Use of sand and gravel resources (e.g., for construction material and concrete) for new facilities and roadways would not be expected to reduce

availability of these materials from local suppliers. No sand and gravel deposits of economic interest are known or expected to be present on Wurtsmith AFB. Conversion of sand or gravel deposits on base to other uses would not cause substantial impacts because the uses proposed would not necessarily cause an irretrievable loss and because the state contains a large quantity of these resources.

The Proposed Action is not expected to cause any impacts to potential oil and gas resources. The proposed reuse activities are similar to existing base operations; therefore, conditions regarding petroleum are not expected to change. These actions would not cause any irreversible or irretrievable loss of resources. During the disposal process, the Air Force would coordinate the transfer and conditions of the existing oil and gas lease with the reuse entity.

Under this alternative, 551 acres of land would be disturbed. Because local soils are susceptible to wind erosion, short-term impacts could occur. During ground-disturbing activities, removal of vegetative cover and grading activities would increase the potential for wind erosion. However, once these areas have been covered with pavement, buildings or facilities, or vegetation, susceptibility to erosion would be minimal.

As indicated by the Farmland Conversion Impact Rating (Appendix L), no impacts to prime or unique farmland would occur under the Proposed Action. Further, because the soils are well suited for roadway and facility development, there would be no impacts to soils from construction activities (East Central Michigan Planning and Development Regional Commission, 1973).

Air Force Fee-Owned Land. Minor erosion effects could occur on Air Force fee-owned land as a result of ground disturbance, particularly during demolition of housing units in the southeastern portion of the base. As discussed above, disposal of property containing oil and gas lease rights would be coordinated with the new landowner.

Mitigation Measures. Mitigation measures are available to minimize erosion problems associated with wind, especially during ground-disturbing activities when trenches and cut slopes are exposed. When cut slopes are exposed, the following measures may be useful in limiting erosion:

- Addition of protective coverings such as mulch, straw, or other material (tacking will be required)

- Limiting the amount of area disturbed and the length of time slopes and barren ground are left exposed.

After the construction phase, long-term erosion control can be accomplished by keeping soils under vegetative cover and planting windbreaks. The type of vegetation used as windbreaks must comply with FAA standards in areas intended for aircraft runways. After construction, soils underlying facilities and pavements would not be subject to erosion.

4.4.1.2 Fire Training Alternative. Types of impacts associated with soils and geology under this alternative would be similar to those under the Proposed Action, except that less land (351 acres) would be disturbed. Additional impacts could be associated with runoff from the burn areas, which could contaminate soils. However, proper management practices associated with used fire fighting water (refer to Section 2.3.1.2) would minimize the potential for runoff from the burn areas to infiltrate the existing storm water system and contaminate soils along drainage courses and ditches. There would be some potential for increased erosion of soils by wind and water in the forest fire training areas until vegetation becomes re-established. Because of the permeable soils and flat topography, water erosion effects would be minimal. Impacts related to potential oil and gas resources would be the same as for the Proposed Action.

Air Force Fee-Owned Land. Minor erosion effects could occur on Air Force fee-owned land as a result of ground disturbance, particularly during demolition of housing units in the southeastern portion of the base or demolition of any industrial or commercial buildings in the east-central portion of the base. Disposal of property containing oil and gas lease rights would be coordinated with the new landowner.

Mitigation Measures. Potential mitigation measures to minimize erosion would be similar to those discussed for the Proposed Action. In addition, mitigation measures to minimize the potential for soil contamination from burn area runoff would have to be established. Measures to minimize the potential for soil contamination by collecting and treating used fire fighting water have been incorporated in the Fire Training Alternative proposal (see Section 2.3.1.2). In addition, it is recommended that regular leak testing of the aboveground sewer system, the oil/water separator, and the water retention pond be conducted.

4.4.1.3 Recreation Alternative. Types of impacts associated with soils and geology under this alternative would be similar to those under the Proposed Action, except that slightly more land (614 acres) would be disturbed. Exposure of soils caused by the demolition of more than one-half of the existing structures and development of a golf course would increase the potential for erosion, but these impacts would be short term until revegetation is established.

Air Force Fee-Owned Land. Erosion effects could occur on Air Force fee-owned land as a result of ground disturbance, particularly during

demolition of most of the housing units in the southeastern portion of the base.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action. After demolition of existing structures, the length of time vegetation and other cover are absent should be minimized.

4.4.1.4 No-Action Alternative. The No-Action Alternative would result in no impacts to the soils and geology of the base area or the surrounding region. The construction activities associated with this alternative would be minimal or nonexistent and restricted to maintenance-type activities. Therefore, no mitigation measures would be required.

4.4.1.5 Other Land Use Concepts. The Advanced Environmental Technology Facility would not create any impacts to soils or geology because no ground disturbance would be involved.

4.4.2 Water Resources

The following section describes the potential environmental effects on water resources as a result of the Proposed Action and reuse alternatives. Ground-disturbing activities could alter soil profiles and natural drainages, which, in turn, could alter water flow patterns temporarily. Impacts on water quality from hazardous waste contamination are addressed in Section 4.3, Hazardous Materials and Hazardous Waste Management.

4.4.2.1 Proposed Action

Surface Water. Under the Proposed Action, soils would be compacted during facility construction, renovation, and demolition and infrastructure improvements and overlain by asphalt, asphaltic concrete, or buildings, creating impervious surfaces that would cause increased storm water runoff to local storm sewers and sewage systems. As a result, drainage patterns would be altered to divert water away from facilities and airfield pavements. Storm water discharge (non-point source) from the airfield, airfield support areas, and other heavy industrial areas may contain fuels, oils, and other residual contaminants, which could degrade surface water resources in the Au Sable River and Van Etten Creek.

It is assumed that ground-disturbing activities (see Table 2.2-3) under the Proposed Action would occur in areas historically subject to development (i.e., in the eastern part of the base, in or adjacent to the cantonment area). As a result, minimal or no ground disturbance would occur in the floodplains along the Au Sable River and adjacent to Van Etten Lake (see Figure 3.4-2). Therefore, impacts to floodplains would be minimal. The establishment of these areas as recreation areas could indirectly cause positive impacts, in

that these uses would preserve the floodplains and prevent future development.

To ensure minimal potential for future impacts to floodplains, the Air Force would comply with appropriate requirements for disposal of property in floodplains, as established in Executive Order 11988 and Air Force Regulation 19-9. Property transferred to other federal agencies (e.g., the U.S. Forest Service property) would continue to be subject to these requirements; disposal of lands to non-federal agencies or private entities would require full disclosure of federal, state, and local restrictions on use of the floodplains.

Nearby Lake Huron provides an abundant supply of surface water, and would be a possible alternate water source in the event that existing on-base groundwater wells are closed. The communities surrounding Wurtsmith AFB are currently considering several long-term water supply alternatives, including connection to the plant as Tawas Point, which is supplied from Lake Huron.

The project may also be subject to NPDES permit requirements for storm water discharges during the construction period and for the duration of airport operations. This provision is contained in the NPDES Permit Application Regulations for Storm Water Discharges issued by the EPA as a final rule on November 16, 1990. Oil/water separators could be installed to improve water quality prior to discharge to storm water drainage systems.

Groundwater. Under the Proposed Action, there would be minimal adverse impacts to groundwater resources. In fact, closing the wastewater seepage beds would result in a beneficial effect on groundwater quality. Projected water demand in the ROI for the years 1998, 2003, and 2013 is shown in Table 4.4-1. Local groundwater supplies would be sufficient to meet projected demands.

Table 4.4-1. Projected Water Demand - Proposed Action

Year	Projected demand (MGD)	Projected Annual Demand (MG/yr)	Projected Baseline Demand (MG/yr)	Percent Increase above Baseline
1998	1.92	701	526	33
2003	2.04	745	526	42
2013	2.24	818	522	57

Note: Preclosure (1990) ROI demand averages approximately 0.62 MGD (226 million gallons [MG]/yr).

In the year 2013, on-site demand is expected to be 0.50 MGD, which is approximately 81 percent of the preclosure (1990) base demand. The current production capacity of the on-base wells is 2.2 MGD (U.S. Air Force,

1990b), which would be adequate to meet the anticipated needs. However, if the migration of contaminated groundwater plumes results in the closure of the on-base wells, an alternate supply source would have to be developed.

Consideration of Township of Oscoda wellhead protection areas in terms of the Proposed Action may require some coordination and related activities during reuse, but the Proposed Action itself is expected to have minimal environmental impact on the wellhead areas. Construction activities would occur no closer than 0.75 mile from either Oscoda well field, and both well fields are separated from the base by hydrologic divides (i.e., Van Etten Lake and the Au Sable River). Therefore, groundwater contamination from the Wurtsmith AFB area would not be able to reach the well locations under current hydrologic conditions, because the contamination could not flow upgradient to the wells from the hydrologic divide.

Water supply wells on Wurtsmith AFB may continue to be used in the short term under the Proposed Action. Because of known existing groundwater contamination on Wurtsmith AFB, careful monitoring of water quality conditions at these wells would be appropriate. Also, these wells would become subject to the local ordinances, and may need to be considered in terms of the state wellhead protection program; these factors may restrict future development/activities adjacent to the wells.

The wellhead area issues would be resolved if current plans are implemented to connect Oscoda and the base to the Tawas City water supply system. In that case, all existing water supply wells on Wurtsmith AFB and within Oscoda would be abandoned, and there would be no impacts to wellhead areas.

Air Force Fee-Owned Land. Minor surface runoff effects could occur on Air Force fee-owned land as a result of ground disturbance, particularly during demolition of housing units in the southeastern portion of the base or demolition of any industrial or commercial buildings in the east-central portion of the base. In disposing of fee-owned lands within floodplains, the Air Force would comply with disposal activities established by Executive Order 11988.

Mitigation Measures. To minimize the potential impacts of surface water runoff, construction designs should incorporate provisions to reduce storm water runoff. The following practices could be implemented to reduce the impacts to surface water quality:

- Create landscaped areas that are pervious to surface water
- Minimize areas of surface disturbance

- Control site runoff
- Minimize time that disturbed areas are exposed to erosion
- Schedule surface-disturbing activities during dry seasons
- Provide regular street sweeping.

If Wurtsmith AFB water supply wells remain in use, continued remediation activities under the IRP program as well as continued monitoring of the water quality in the wells would assist in minimizing impacts. Implementation of a wellhead protection program for the base wells would reduce the possibility of impacts to water supply. Development of new water supply sources (as discussed above) would eliminate the potential for impacts by eliminating the use of the wells themselves.

4.4.2.2 Fire Training Alternative

Surface Water. The types of impacts to surface water resources under this alternative would be similar to those under the Proposed Action. The runoff from the burn areas could potentially contaminate surface waters through infiltration of the existing storm water systems that discharge into the Au Sable River.

Groundwater. The quantity of groundwater extracted under this alternative would be less than that required for the Proposed Action. As under the Proposed Action, there would be minimal adverse effects on groundwater, and a likely beneficial effect from closing the wastewater seepage beds. Projected ROI water demand for the years 1998, 2003, and 2013 is shown in Table 4.4-2. Local groundwater supplies would be sufficient to meet projected demands.

Table 4.4-2. Projected Water Demand - Fire Training Alternative

Year	Projected Demand (MGD)	Projected Annual Demand (MG/yr)	Projected Baseline Demand (MG/yr)	Percent Increase above Baseline
1998	1.65	602	526	14
2003	1.76	642	526	22
2013	1.89	690	522	32

Note: Preclosure (1990) ROI demand averages approximately 0.62 MGD (226 MG/yr).

By the year 2013, water demand on-site is expected to be 0.38 MGD, approximately 61 percent of the 1990 base demand. This projected demand could be met by the capacities of the existing on-base wells. Effects are

expected to be similar to those under the Proposed Action. Used water from the burn areas would be channeled in lined drainages and contained in a double-lined retention pond after passing through an oil/water separator to prevent contamination of groundwater.

Air Force Fee-Owned Land. Minor surface runoff effects could occur on Air Force fee-owned land as a result of ground disturbance, particularly during demolition of housing units in the southeastern portion of the base or demolition of any industrial or commercial buildings in the east-central portion of the base.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action. Measures to minimize the potential for surface water and groundwater contamination by collecting and treating used fire fighting water have been incorporated in the Fire Training Alternative proposal (see Section 2.3.1.2). The following additional measures may be useful in minimizing the potential for contamination:

- Regular leak testing of the aboveground sewer system, the oil/water separator, and the water retention pond
- Groundwater monitoring utilizing the existing groundwater monitoring devices in the alert facility.

4.4.2.3 Recreation Alternative

Surface Water. The types of impacts to surface water resources under this alternative would be similar to those under the Proposed Action.

Groundwater. The quantity of groundwater extracted under this alternative would be significantly less than that required for the Proposed Action. As under the Proposed Action, there would be minimal adverse effects, and likely beneficial effects from closing the groundwater seepage beds. Projected water demand in the ROI for the years 1998, 2003, and 2013 is shown in Table 4.4-3. Local groundwater supplies would be sufficient to meet projected demands.

Table 4.4-3. Projected Water Demand - Recreation Alternative

Year	Projected demand (MGD)	Projected Annual Demand (MG/yr)	Projected Baseline Demand (MG/yr)	Percent Increase above Baseline
1998	1.54	562	526	7
2003	1.61	588	526	12
2013	1.71	624	522	20

Note: Preclosure (1990) ROI demand averages approximately 0.62 MGD (226 MG/yr).

By the year 2013, water demand on-site is expected to be 0.17 MGD, which is approximately 27 percent of the 1990 base demand. This projected demand could be met by the capacities of the existing on-base wells.

Air Force Fee-Owned Land. Surface runoff effects could occur on Air Force fee-owned land as a result of ground disturbance, particularly during demolition of most of the housing units in the southeastern portion of the base or demolition of any industrial or commercial buildings in the east-central portion of the base.

Mitigation Measures. Potential mitigation measures would be similar to those discussed for the Proposed Action.

4.4.2.4 No-Action Alternative. The No-Action Alternative would have positive effects on surface and groundwater quality because there would be very limited operations and no increase in population. Water demands for OL personnel and activities would be minimal and could be accommodated from existing supply systems. No mitigation measures would be required.

4.4.2.5 Other Land Use Concepts. Implementation of the Advanced Environmental Technology Facility in combination with the Proposed Action or alternatives would not create any additional impacts to water resources because it would result in only a minimal net increase in water demand, which could be met by existing supplies.

4.4.3 Air Quality

Air quality impacts could occur during reuse activities associated with the Proposed Action and alternatives for the reuse of Wurtsmith AFB. Intermittent construction-related impacts could result from fugitive dust (particulate matter). Reuse-related impacts could occur from: (1) mobile sources such as aircraft, aircraft operation support equipment, commercial transport vehicles, construction vehicles, and personal vehicles; (2) point sources such as heating/power plants, generators, incinerators, and storage tanks; (3) fugitive dust due to construction activities; and (4) secondary emission sources associated with a general population increase, such as residential heating.

The methods selected to analyze impacts depend upon the type of air emission source being examined. Air quality analytical methods are summarized here and presented in detail in Appendix K. The primary emission source categories associated with the Proposed Action and alternatives include construction, aircraft, vehicles, point sources, and indirect source emissions related to population increase. Analysis for the construction phase is limited to estimating the amount of uncontrolled fugitive dust that may be emitted from disturbed areas. Analysis for point

source and indirect source emissions during the operations phase consists of quantifying the emissions using per-capita emission factors based on regional emissions and population. Aircraft and vehicular emissions were estimated using the emission factors in Emissions and Dispersion Modeling System (EDMS). The impacts of project-related annual emissions were evaluated based on how these emissions would affect maintenance of the NAAQS and MAAQS.

The local air quality impacts of aircraft and mobile source emissions are analyzed by modeling. The EDMS is used to simulate the dispersion of emissions from aircraft operations (Segal, 1991). EDMS was developed jointly by the FAA and the U.S. Air Force specifically for the purpose of generating airport and airbase emission inventories and for calculating the concentrations caused by these emissions as they disperse downwind. The EDMS model uses EPA aircraft emission factors and information on peak and annual landing and takeoff cycles to produce an emissions inventory report for the aircraft operations.

Air quality analysis is presented for the Proposed Action and alternatives through the year 2003. The effects of the 1990 CAA Amendments, such as electric and other low emission vehicle ownership percentage, cannot be accurately predicted very far into the 21st Century. The uncertainties of long-range population and traffic projections, future CAA changes, and the complex interaction of meteorology with emission inventories makes a 20-year emission and air quality projection too speculative.

The following assumptions were made in estimating the effects of the Proposed Action and alternatives:

- With the exception of fugitive dust, aircraft, and fire training emissions, emission inventory amounts of ROG, NO_2, PM_{10}, SO_2, and CO are based on the ratio of emissions to population, as defined by available preclosure emissions and population for Iosco County.

- Mobile source emissions associated with the base residential area were estimated by assuming that the area was similar to a parking lot and was modeled using EDMS.

The process by which a regulatory agency permits major new sources or modifications of existing sources depends on the attainment status of the source location. In an area meeting the NAAQS, or attainment area, the process is called PSD and it limits the allowable ambient impact of emissions to specific increments as previously shown in Table 3.4-2. The increments are designed to prevent significant degradation of the area's acceptable air quality. Because Wurtsmith AFB is in an area that is unclassified and assumed to be in attainment of all criteria pollutants, PSD requirements for major new or modified sources would apply.

Emissions associated with the proposed industrial and fire training activities will be subject to review by the MDNR. The federal CAA and Michigan air quality regulations require that industrial sources obtain operating permits and institute pollution reduction measures if a source is determined to be a major source or to cause a significant environmental impact. Specific requirements are determined on a case-by-case basis.

4.4.3.1 Proposed Action. Total estimated emissions of the Proposed Action are presented in Table 4.4-4 for the years 1998 and 2003. The table also provides a comparison of the magnitude of reuse-related emissions in relation to preclosure emission levels.

Table 4.4-4. Pollutant Emissions Associated with the Proposed Action

	Preclosure Emissions (tons/day)		Base Reuse Emissions (tons/day)		Percentage Increase in County Emissions	
Pollutant	County[a]	Wurtsmith[b] AFB	1998	2003	1998	2003
Nitrogen dioxide	4.2	0.7	0.38	0.48	9	11
ROG	14.2	4.5	1.08	1.35	8	10
PM_{10}	[c]	0.07	0.68	0.77	[c]	[c]
Sulfur dioxide	0.5	0.08	0.05	0.06	10	12
Carbon monoxide	33.3	4.7	3.30	4.75	10	14

Notes: (a) Includes Wurtsmith AFB.
(b) Base activities only.
(c) Data not available.

Construction. Fugitive dust would be generated during construction activities associated with construction, site clearing, and improvements to structures, roads, and utilities. Uncontrolled fugitive dust (particulate matter) emissions from ground-disturbing activities would be emitted at a rate of 110 pounds per acre per day (EPA, 1985). The PM_{10} fraction of the total fugitive dust emissions is assumed to be 50 percent, or 55 pounds per acre per working day.

It is estimated that construction on base would disturb 517 acres over the 10-year period of project development (see Table 2.2-3). It was assumed that the disturbance would be equally distributed within each period of analysis. The average daily PM_{10} emissions are estimated to be 0.09 ton between 1993 and 1998, and 0.02 ton between 1998 and 2003 (see Appendix K). These PM_{10} emissions would cause elevated short-term concentrations at receptors located close to the construction areas. However, the elevated concentrations would be temporary and would fall off rapidly with distance.

Operations. Total estimated operations emissions associated with operations under the Proposed Action are included with the construction emissions in Table 4.4-4 for the years 1998 and 2003. Aircraft emissions were calculated using EDMS. Estimates for all other categories of emissions were calculated using per-capita estimates as described in Appendix K.

Potential impacts to air quality as a result of air emissions from the operations under the Proposed Action were evaluated in terms of two spatial scales: regional and local. The regional-scale analysis considered the potential for project emissions to cause or contribute to a nonattainment condition in Iosco County. The local-scale analysis evaluated the potential impact to ambient air quality concentrations in the immediate vicinity of the base.

Regional Scale. The evaluation of regional-scale impacts from the Proposed Action considered the effect any new air emissions would have on maintaining the air quality attainment status of Iosco County. The following paragraphs summarize the results of the regional-scale impact analysis on a pollutant-by-pollutant basis. Table 4.4-4 summarizes the results of the emission calculations for the Proposed Action for the years 1998 and 2003.

Ozone Precursors. The reuse emissions of NO_2 and ROG would increase from No-Action Alternative conditions but would remain below the preclosure emission levels for Wurtsmith AFB. The regional air quality impacts associated with those emissions would be negligible.

CO, NO_2, PM_{10}, and SO_2. Projected NO_2 and SO_2 emissions from the Proposed Action would be lower than preclosure emissions from Wurtsmith AFB. Emissions of PM_{10} and CO would be greater than preclosure base emissions, but still represent an increase of less than 15 percent in county emissions.

The majority of emissions associated with the base reuse inventory are from the category "Other Activities" (see tables in Appendix K). These emissions, with the exception of a small percentage from industrial activities, would be directly related to the increased population associated with the Proposed Action. The population of Iosco County in the year 2003 is predicted to be 26,500 (including the Proposed Action), which is lower than the Iosco County population census of 30,209 in 1990. This decrease in population, and the associated per-capita emissions, would, to a certain extent, offset the increase in emissions associated with Proposed Action operations.

Local Scale. A summary of the EDMS analysis results is presented in Table 4.4-5. The results show that during peak-hour operations, the maximum 1-hour pollutant concentration would occur approximately 1,000 feet downwind of the runway centerline. All of the pollutant

Table 4.4-5. Air Quality Modeling Results for the Proposed Action ($\mu g/m^3$)[a][b]

Pollutant	Averaging Time	NAAQS	Preclosure[c] Concentrations	1998	2003
Carbon monoxide	8-Hour	10,000	400	672	697
	1-Hour	40,000	700	960	996
Sulfur dioxide	Annual	80	10	2.1	2.2
	24-Hour	365	40	8.3	8.6
	3-Hour	1,300	100	18.7	19.4
PM_{10}	Annual	50	20	1.2	1.2
	24-Hour	150	55	4.9	4.9

Notes: (a) Modeled impact is an on-base location in proximity to roadways and parking lots. Additional impact points are located approximately 1,000 feet (300 meters) downwind of the ends of the runway.
(b) These emissions include aircraft and motor vehicle activity.
(c) Estimated concentrations, provided by MDNR, Air Quality Division, reflect preclosure ambient air quality.

concentrations would be below the applicable standard in the immediate area surrounding the airport, and would have no measurable effect on the local air quality.

Mitigation Measures. Air quality impacts during construction would occur primarily from fugitive dust emissions from ground-disturbing activities. Water application during ground-disturbing activities could mitigate fugitive dust emissions by at least 50 percent (EPA, 1985). Decreasing the time period during which newly graded sites are exposed to the elements would further mitigate fugitive dust emissions. Implementation of these measures would substantially reduce air quality effects from construction activities associated with the Proposed Action. In addition, all aviation development during the construction phase would comply with measures contained in the FAA Standards for Specifying Construction of Airports (FAA, 1990d).

Although the impacts caused by reuse emissions are minimal and well below standards, pollution prevention measures could be implemented to reduce motor vehicle emissions. These measures would probably involve land use or transportation planning and management methods to reduce vehicle miles traveled, vehicle trips, and peak-hour travel. These reductions would, therefore, reduce both regional and localized vehicle-related emissions of NO_x, ROG, and PM_{10}.

4.4.3.2 Fire Training Alternative. Table 4.4-6 summarizes the results of the emission calculations for the Fire Training Alternative for the years 1998 and 2003. This table also provides a comparison of the magnitude of the reuse-related emissions in relation to the preclosure emission levels.

Table 4.4-6. Pollutant Emissions Associated with the Fire Training Alternative

Pollutant	Preclosure Emissions (tons/day)		Base Reuse Emissions (tons/day)		Percentage Increase in County Emissions	
	County[a]	Wurtsmith[b] AFB	1998	2003	1998	2003
Nitrogen dioxide	4.2	0.7	0.20	0.28	5	7
ROG	14.2	4.5	0.51	0.73	4	5
PM_{10}	[c]	0.07	0.65	0.75	[c]	[c]
Sulfur dioxide	0.5	0.09	0.02	0.03	14	6
Carbon monoxide	33.3	4.7	4.79	5.47	14	16

Notes: (a) Includes Wurtsmith AFB.
(b) Base activities only.
(c) Data not available.

Construction. Construction impacts from this alternative would be less than under the Proposed Action because of the smaller amount of land disturbance that would occur. It is estimated that 249 acres would be disturbed by construction over the 10-year period of analysis, releasing an estimated 0.05 and 0.02 tons of PM_{10} per working day, respectively, for the two periods of analysis. The impact of these emissions would cause elevated concentrations of particulates at receptors close to the construction areas, decreasing rapidly with distance from the construction areas.

Operations. Table 4.4-6 summarizes the results of the Fire Training Alternative for the years 1998 and 2003. Estimates of emissions from the fire training activities were calculated using EPA emission factors for forest fires, open burning propane, and fuel oil. Emissions from fire training activities were modeled using the EPA SCREEN model, as discussed in Appendix K. EDMS was used to model emissions from motor vehicles. Estimates for all other categories of emissions were calculated using per-capita estimates, as described in Appendix K.

Potential impacts to air quality as a result of air emissions from the operations under the Fire Training Alternative were evaluated in terms of two spatial scales: regional and local. The regional-scale analysis considered the potential for project emissions to cause or contribute to a nonattainment condition in Iosco County. The local-scale analysis evaluated the potential impact to ambient air quality concentrations in the immediate vicinity of the base.

Regional Scale. The evaluation of regional-scale impacts from the Fire Training Alternative considered the effect any new emissions would have on

maintaining the air quality attainment status of Iosco County. The following paragraphs summarize the results of the regional-scale impact analysis on a pollutant-by-pollutant basis. Table 4.4-6 summarizes the results of the NO_2 and ROG emission calculations for the Fire Training Alternative for the years 1998 and 2003.

Ozone Precursors. The reuse emissions of ROG and NO_2 would be much lower than the preclosure base emissions and would have no adverse effect on regional air quality.

CO, NO_2, PM_{10}, and SO_2. Table 4.4-6 shows that NO_2 and SO_2 emissions from the Fire Training Alternative would be lower than preclosure base emissions. Although reuse emissions of PM_{10} and CO would be greater than the corresponding preclosure base emissions, there would be no adverse impacts to regional air quality associated with these emissions.

Local Scale. Dispersion modeling results indicated that daily emissions from the training fires would not have an impact on local ambient conditions (Table 4.4-7). Modeling results from the forest fire training activities (Table 4.4-8) indicate that ambient air concentration of PM_{10} may exceed the 24-hour NAAQS when existing background levels are considered. Furthermore, the predicted impact exceeds the PSD increment for PM_{10} (see Table 3.4-2).

Since the forest fires would be planned only once or twice per year (if at all), under the direction of the MDNR and during suitable meteorological conditions, the impacts predicted by the dispersion modeling analysis may somewhat overestimate potential impacts. The ambient air quality impact of fire training activities should be reevaluated using more refined models when a more definite plan is developed. The MDNR should be consulted regarding the choice of computer model, dispersion parameters, and PSD requirements.

Mitigation Measures. The impact of emissions from fire training activities can be mitigated by restricting the staging of fires to periods of time when meteorological conditions provide for good dispersion of pollutants in the ambient air. In general, this can be accomplished by avoiding nighttime and early morning hours or periods of atmospheric inversion (rainy or heavily clouded days). Impacts can also be minimized by restricting activities to one fire staging area at a time.

Mitigation measures for other activities under this alternative would be similar to those discussed for the Proposed Action.

4.4.3.3 Recreation Alternative. Total estimated emissions for this alternative are shown in Table 4.4-9 for the years 1998 and 2003. The

Table 4.4-7. Air Quality Modeling Results for the Fire Training Alternative ($\mu g/m^3$)[a,b]

Pollutant	Averaging Time	NAAQS	Preclosure[c] Concentrations	1998	2003
Carbon monoxide	8-Hour	10,000	400	347	664
	1-Hour	40,000	700	496	468
Sulfur dioxide	Annual	80	10	0.123	0.151
	24-Hour	365	40	0.190	0.220
	3-Hour	1,300	100	0.429	0.489
PM_{10}	Annual	50	20	0.748	0.793
	24-Hour	150	55	1.376	1.431

Note: (a) Modeled impact is an on-base location in proximity to roadways and parking lots.
(b) These emissions include fire training and motor vehicle activity.
(c) Existing concentrations reflect preclosure ambient air quality.

Table 4.4-8. Air Quality Modeling Results for Forest Fire Training Activities ($\mu g/m^3$)[a,b]

Pollutant	Averaging Time	NAAQS	Preclosure[c] Concentrations	1998	2003
Carbon monoxide	8-Hour	10,000	400	1,973	1,973
	1-Hour	40,000	700	2,819	2,819
Sulfur dioxide[d]	Annual	80	10	0	0
	24-Hour	365	40	0	0
	3-Hour	1,300	100	0	0
PM_{10}	Annual	50	20	NA[e]	NA[e]
	24-Hour	150	55	109.8	109.6

Notes: (a) Modeled impact is an on-base location in proximity to roadways and parking lots.
(b) These emissions include forest fire training activities only.
(c) Existing concentrations reflect preclosure ambient air quality.
(d) Based on the assumption that trees have no sulfur content.
(e) Annual averages are not appropriate for these single-event forest fire activities. See discussion in Appendix K.

Table 4.4-9. Pollutant Emissions Associated with the Recreation Alternative

Pollutant	Preclosure Emissions (tons/day) County[a]	Preclosure Emissions (tons/day) Wurtsmith[b] AFB	Base Reuse Emissions (tons/day) 1998	Base Reuse Emissions (tons/day) 2003	Percentage Increase in County Emissions 1998	Percentage Increase in County Emissions 2003
Nitrogen dioxide	4.2	0.7	0.07	0.12	2	3
ROG	14.2	4.5	0.20	0.35	1	2
PM_{10}	[c]	0.07	0.22	0.21	[c]	[c]
Sulfur dioxide	0.5	0.09	0.01	0.02	2	4
Carbon monoxide	33.3	4.7	0.58	1.04	2	3

Notes: (a) Includes Wurtsmith AFB.
(b) Base activities only.
(c) Data not available.

table also provides a comparison of the magnitude of reuse-related emissions in relation to preclosure emission levels.

Construction. It is estimated that a total of 481 acres would be disturbed over the 10 years after closure, resulting in release of an estimated 0.10 and 0.004 ton per day over the two periods of analysis. The impact of these emissions would cause elevated concentrations of particulates at receptors close to the construction areas, decreasing rapidly with distance from the construction areas.

Operations. Table 4.4-9 summarizes the results of the emissions calculations associated with the Recreation Alternative for the years 1998 and 2003. Emissions were calculated using per-capita estimates as described in Appendix K.

Potential impacts to air quality as a result of air emissions from the operations under the Recreation Alternative were evaluated in terms of two spatial scales: regional and local. The regional-scale analysis considered the potential for project emissions to cause or contribute to a nonattainment condition in Iosco County. The local-scale analysis evaluated the potential impact to ambient air quality concentrations in the immediate vicinity of the base.

Regional Scale. The evaluation of regional-scale impacts from the Recreation Alternative considered the effect any new air emissions would

have on maintaining the air quality attainment status of Iosco County. The following paragraphs summarize the results of the regional-scale impact analysis on a pollutant-by-pollutant basis. Table 4.4-9 summarizes the results of the emission calculations for the Proposed Action for the years 1998 and 2003.

Ozone Precursors. The reuse emissions of NO_2 and ROG would be much lower than the preclosure base emission levels. There would be no adverse impacts to regional air quality associated with these emissions.

CO, NO_2, PM_{10} and SO_2. Table 4.4-9 shows that, with the exception of PM_{10}, emissions from the Recreation Alternative would be lower than preclosure emissions from Wurtsmith AFB. The majority of PM_{10} emissions would be short-term emissions associated with construction and demolition activities. There would be no adverse impacts to regional air quality.

The majority of emissions associated with the base reuse inventory are from the category, "Other Activities" (see tables in Appendix K). These emissions, with the exception of a small percentage from industrial activities, would be directly related to the increased population associated with the Recreation Alternative. The population of Iosco County in the year 2003 is predicted to be 23,727 (including the Recreation Alternative), which is lower than the Iosco County population census of 30,209 in 1990. This decrease in population, and associated per-capita emissions would, to a certain extent, offset increases in emissions associated with Recreation Alternative activities.

Local Scale. A summary of the EDMS analysis is presented in Table 4.4-10. The modeling results indicate that all of the pollutant concentrations would be below the applicable standard in the immediate area surrounding the base, and would have an insignificant effect on the local air quality.

Mitigation Measures. Mitigation measures would be the same as those discussed for the Proposed Action.

4.4.3.4 No-Action Alternative. The No-Action Alternative would have no adverse impact on air quality. Air quality conditions at the time of closure would not be adversely affected by continued maintenance of the base at the closure level of activity.

Mitigation Measures. Air quality mitigation measures are not required for the No-Action Alternative because there are no adverse impacts associated with this alternative.

4.4.3.5 Other Land Use Concepts. Advanced Environmental Technology Facility activities would generate stationary source air emissions associated with power requirements and mobile source emissions related to vehicle

Table 4.4-10. Air Quality Modeling Results for the Recreation Alternative ($\mu g/mg^3$)[a][b]

Pollutant	Averaging Time	NAAQS	Preclosure[c] Concentrations	1998	2003	2013
Carbon monoxide	8-Hour	10,000	400	341	457	531
	1-Hour	40,000	700	487	653	759
Sulfur dioxide	Annual	80	10	0.073	0.092	0.110
	24-Hour	365	40	0.080	0.110	0.124
	3-Hour	1,300	100	0.184	0.244	0.284
PM_{10}	Annual	50	20	0.134	0.179	0.209
	24-Hour	150	55	0.148	0.203	0.230

Notes: (a) Modeled impact is an on-base location in proximity to roadways and parking lots.
(b) These emissions include motor vehicle activity.
(c) Estimated concentrations, provided by MDNR, Air Quality Division, reflect preclosure ambient air quality.

traffic. These emissions would be minimal and would not affect the current attainment status of Iosco County.

4.4.4 Noise

Environmental impact analysis related to noise includes the potential effects on the local human and animal populations. This analysis will estimate the extent and magnitude of noise levels generated by the Proposed Action and alternatives, using the predictive models discussed below. The baseline noise conditions and predicted noise levels will then be assessed with respect to potential annoyance, sleep disturbance, and land use impacts. The metrics used to evaluate noise are DNL and L_{eq}, which are supplemented occasionally by SEL and the A-weighted maximum sound level (L_{max}). These metrics are measured in units of A-weighted dB. See Appendix J for an expanded discussion of these metrics.

Methods used to quantify the effects of noise such as annoyance, speech interference, sleep disturbance, health, and hearing loss have undergone extensive scientific development during the past several decades. The most reliable measures at present are noise-induced hearing loss and annoyance. Extra-auditory effects (those not directly related to hearing capability) are also important, although they are not as well understood. The current scientific consensus is that "evidence from available research reports is suggestive, but it does not provide definitive answers to the question of health effects, other than to the auditory system, of long-term exposure to noise" (National Academy of Sciences, 1981). The effects of noise are summarized within this section and a detailed description is provided in Appendix J.

Annoyance. Noise annoyance is defined by the EPA as any negative subjective reaction to noise on the part of an individual or group. Table 4.4-11 presents the results of over a dozen studies of transportation modes, including airports, investigating the relationship between noise and annoyance levels. This relationship has been suggested by the National Academy of Sciences (1977) and recently reevaluated (Fidell et al., 1989) for use in describing peoples' reaction to semi-continuous (transportation) noise. These data are shown to provide a perspective on the level of annoyance that might be anticipated. For example, 15 to 25 percent of persons exposed to DNL of 65 to 70 dB are expected to be highly annoyed by the noise levels.

Table 4.4-11. Percentage of Population Highly Annoyed by Noise Exposure

DNL Interval in dB	Percentage of Persons Highly Annoyed
<65	<15
65-70	15-25
70-75	25-37
75-80	37-52

Source: Adapted from National Academy of Sciences, 1977.

Sleep Interference. The effects of noise on sleep are of concern, primarily in assuring suitable residential environments. DNL incorporates consideration of sleep disturbance by assigning a 10 dB penalty to nighttime noise events. SEL may be used to supplement DNL in evaluating sleep disturbance. When SEL is used to evaluate sleep disturbance, SEL values are translated to percent of people awakened. The relationship between percent awakened and SEL is presented in Appendix J. This relationship, however, does not reflect habituation; therefore, long-term sleep disturbance effects are not addressed by SEL. SEL takes into account an event's sound intensity, frequency content, and time duration, by measuring the total A-weighted sound energy of the event and incorporating it into a single number. Unlike DNL, which describes the daily average noise exposure, SEL describes the normalized noise from a single flyover, called an event.

Studies (Lukas, 1975; Goldstein and Lukas, 1980) show great variability in the percentage of people awakened by exposure to noise. A recent review (Pearsons et al., 1989) of the literature related to sleep disturbance, including field as well as laboratory studies, suggests that habituation may reduce the effect of noise on sleep. The authors point out that the relationship between noise exposure and sleep disturbance is complex and affected by the interaction of many variables. The large differences between the findings of the laboratory and field studies make it difficult to determine the best relationship to use. The method developed by Lukas

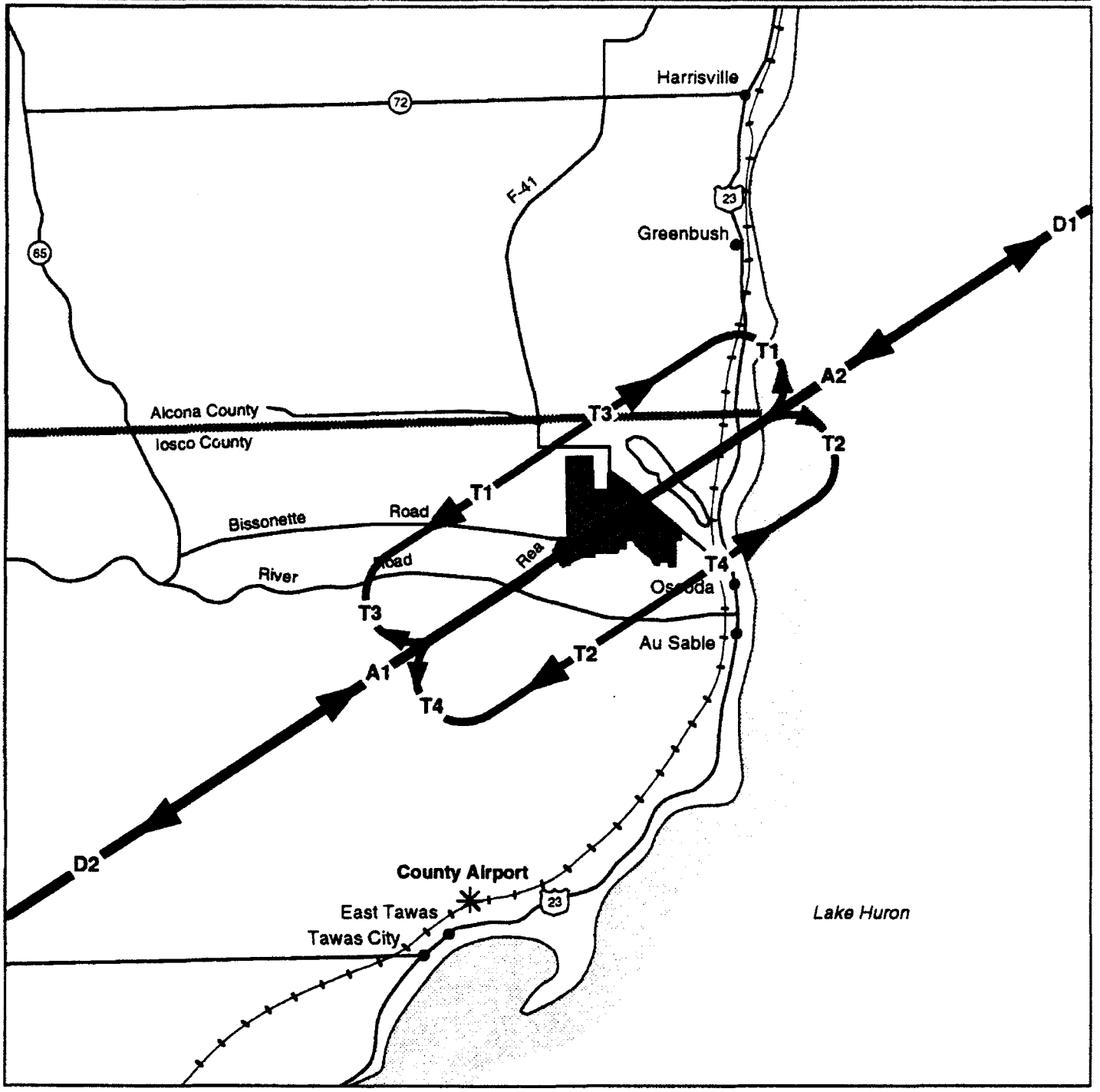
would estimate seven times more awakening than the field results reported by Pearsons.

Land Use Compatibility. Estimates of total noise exposure resulting from aircraft operations, as expressed using DNL, can be interpreted in terms of the compatibility with designated land uses. The Federal Interagency Committee on Urban Noise developed land-use compatibility guidelines for noise (U.S. Department of Transportation, 1980). Based upon these guidelines, suggested compatibility guidelines for evaluating land uses in aircraft noise exposure areas were developed by the FAA and are presented in Section 3.4.4. The land use compatibility guidelines are based on annoyance and hearing loss considerations previously described. Part 150 of the FAA regulations describes the procedures, standards, and methodology governing the development, submission, and review of airport noise exposure maps and airport noise compatibility programs. It prescribes use of yearly DNL in the evaluation of airport noise environments. It also identifies those land-use types that are normally compatible with various levels of exposure. Compatible or incompatible land use is determined by comparing the predicted DNL level at a site with the recommended land uses.

Noise Modeling. In order to define the noise impacts from aircraft takeoff, landing, and touch-and-go operations at Wurtsmith AFB, the FAA-developed Integrated Noise Model (INM), version 3.10, was utilized to predict DNL 65, 70, and 75 dB noise contours and SEL values for noise-sensitive receptors. The FAA-approved noise exposure model (NOISEMAP), version 6.1, was used to calculate noise levels associated with engine runup activity. Appendix J describes these models. The contours were generated for the Proposed Action for three future year projections (5, 10, and 20 years after closure). These contours were overlaid on a USGS map of the base and vicinity. Input data to INM 3.10 include information on aircraft types; runway use; takeoff and landing flight tracks; aircraft altitude, speeds, and engine power settings; and number of daytime (7 a.m. to 10 p.m.) and nighttime (10 p.m. to 7 a.m.) operations.

Surface vehicle traffic noise levels for roadways in the vicinity of Wurtsmith AFB were analyzed using the FHWA's Highway Noise Model (Federal Highway Administration, 1978). This model incorporates vehicle mix, traffic volume projections, and speed to generate DNL.

Major Assumptions. Half of all aircraft operations were assumed to be takeoffs and half landings. Flight tracks (incoming and outgoing), aircraft operations, and mix are included in Appendix J. Vicinity flight tracks assumed for modeling are shown in Figure 4.4-1. All operations were assumed to follow standard glide slopes and takeoff profiles provided by the FAA's INM 3.10. The phasing out of Stage 2 aircraft and subsequent replacement with Stage 3 aircraft are reflected in the aircraft operations.



EXPLANATION

- A — Arriving Flight Track
- D — Departing Flight Track
- T — Touch and Go Flight Track

0 6000 12000 24000 Feet

Primary Flight Tracks - Proposed Action

Figure 4.4-1

Major roads leading to or around the base were analyzed. Traffic data used to project future noise levels were derived from information gathered in the traffic analysis presented in Section 4.2.3, Transportation. Traffic data used in this analysis are presented in Appendix J.

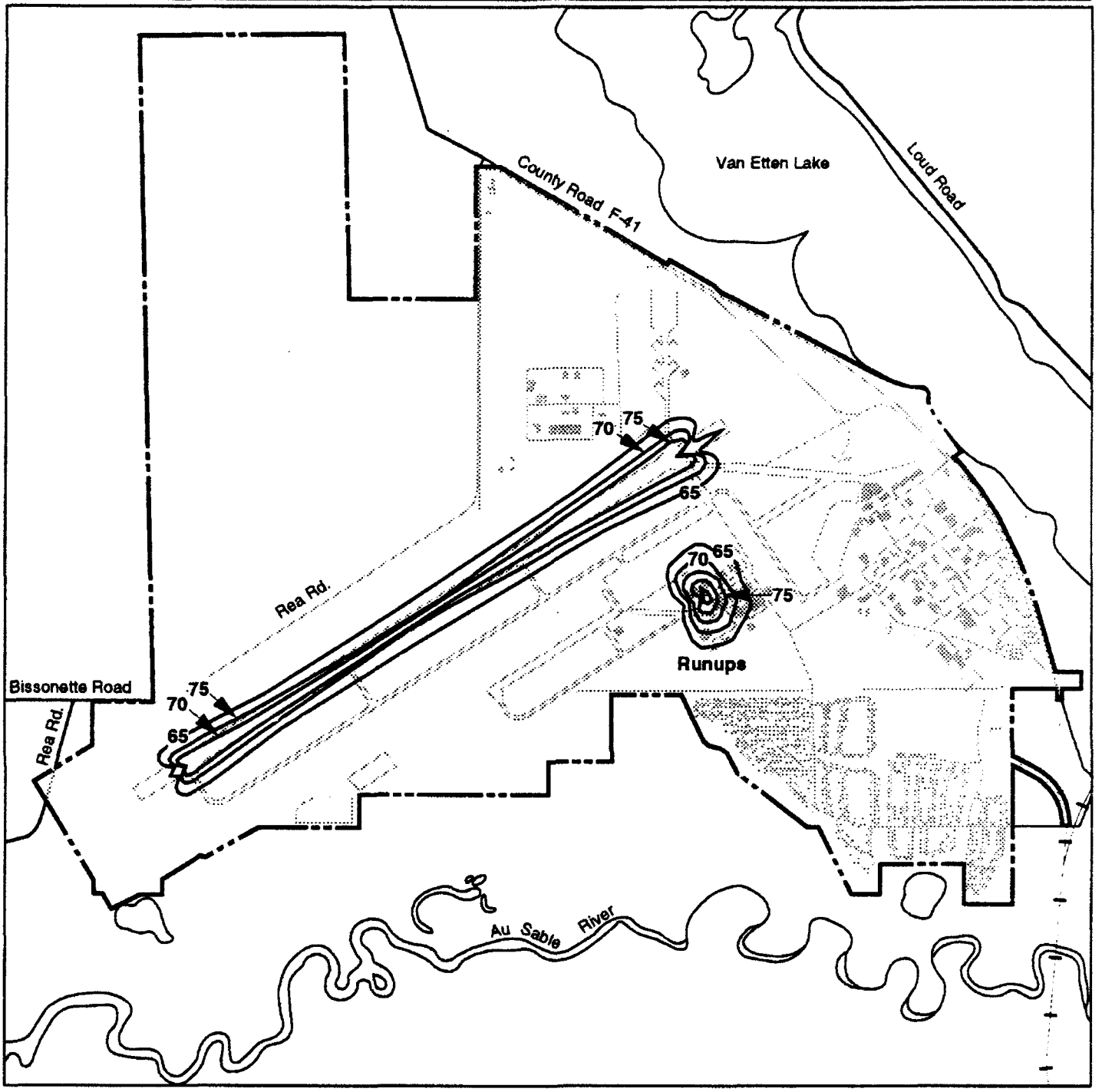
4.4.4.1 Proposed Action. The results of the aircraft noise modeling for the Proposed Action are presented as noise contours in Figures 4.4-2 through 4.4-4. The contribution from runup noise is evident as separate contours to the southeast of the runway. The DNL 65 dB noise contours would be contained within the airfield area. The maximum exposure is projected for 1998, when approximately 275 acres would fall within the DNL 65 dB or greater; this acreage is substantially smaller than the 37,500 acres within DNL 65 dB under preclosure conditions. After the year 2000, the area within the DNL 65 dB contours would decrease to less than 180 acres as quieter aircraft are introduced.

No residences would be exposed to noise levels of DNL 65 dB or greater resulting from aircraft operations. No incompatible land uses were identified due to aircraft noise. The modeled operations reflect the FAA-required conversion of Stage 2 to Stage 3 aircraft. The criteria that define Stage 2 and Stage 3 aircraft are described in FAA Part 36 (FAA, 1988c). Noise level limits are defined for takeoff, approach, and sideline measurements. The modeled aircraft operations reflect this phase-out by replacing the Stage 2 727-100, 727-200, DC-9-50, and DC-8-50 with the Stage 3 727-200 (re-engined), MD-81, and DC-8-70. Based on the certification test results presented in the FAA Advisory Circular 36-1F (FAA, 1992), the modeled Stage 3 aircraft are approximately 3 to 10 dB quieter than the modeled Stage 2 aircraft for takeoffs, and approximately 4 to 12 dB quieter for approaches.

SEL was calculated at representative residential locations (Figure 4.4-5) for the noisiest and most common jet aircraft; the results are presented in Table 4.4-12. The noisiest aircraft were determined from the INM data base. The analysis suggests that, for the Proposed Action, some aircraft overflights could affect the sleep of some residents in the area. However, because only 10 percent of the flights would take place at night, sleep disturbance due to aircraft noise would be minimal.

For the model year 1998, the two noisiest aircraft would be the 727-200 and the DC-8-50, and the most common aircraft would be the Learjet 35. After phase-out of Stage 2 aircraft in the year 2000, the re-engined 727-200 and the 747-400 would be the noisiest aircraft for model years 2003 and 2013. The Learjet 35 would remain the most common jet aircraft through all years.

Surface traffic noise levels for several road segments are presented in Appendix J. These levels are presented in terms of DNL as a function of



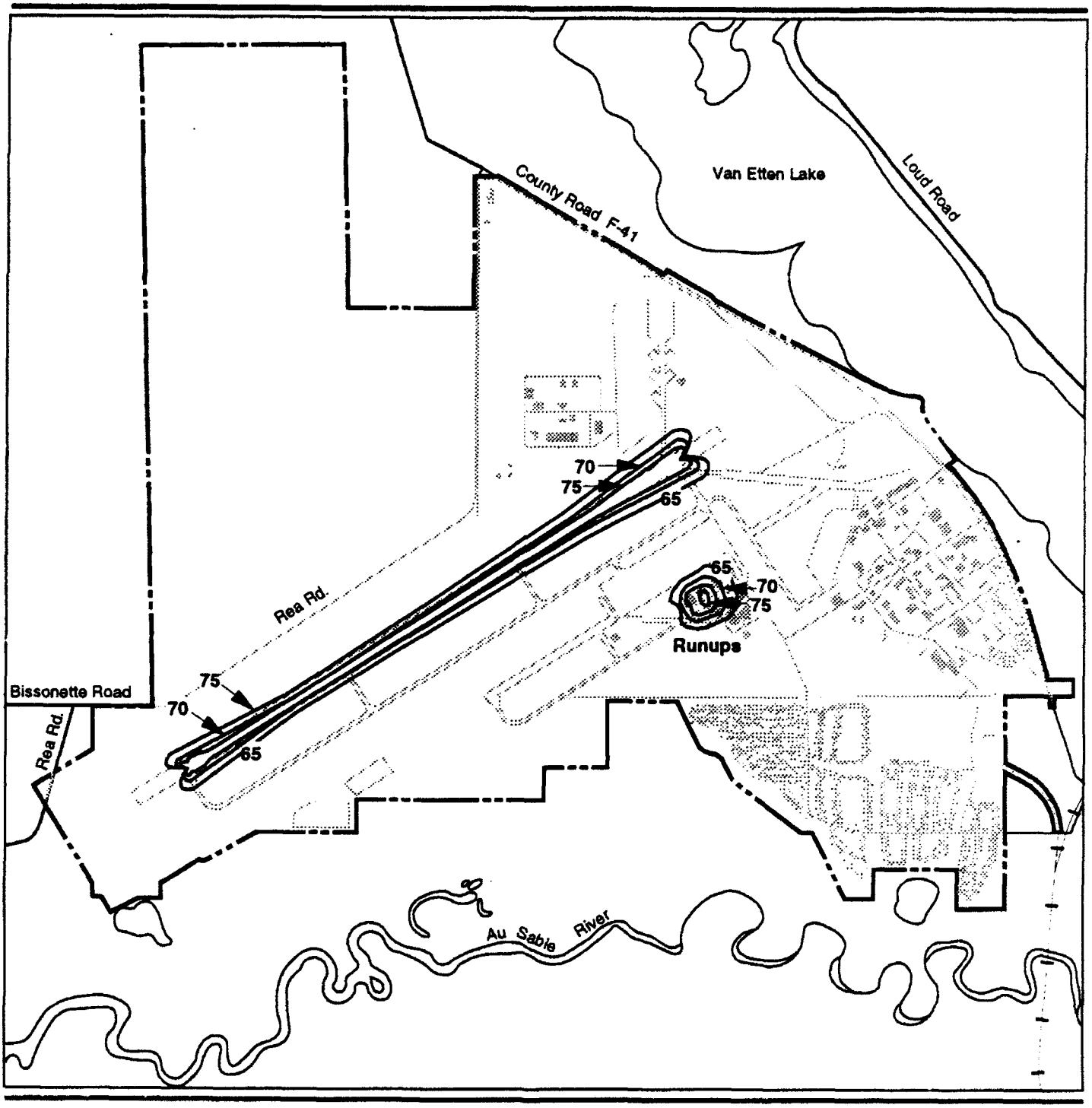
EXPLANATION

- Base Boundary
- DNL Noise Contours (in 5dB intervals)

DNL Noise Contours - Proposed Action (1998)

0 750 1500 3000 Feet

Figure 4.4-2



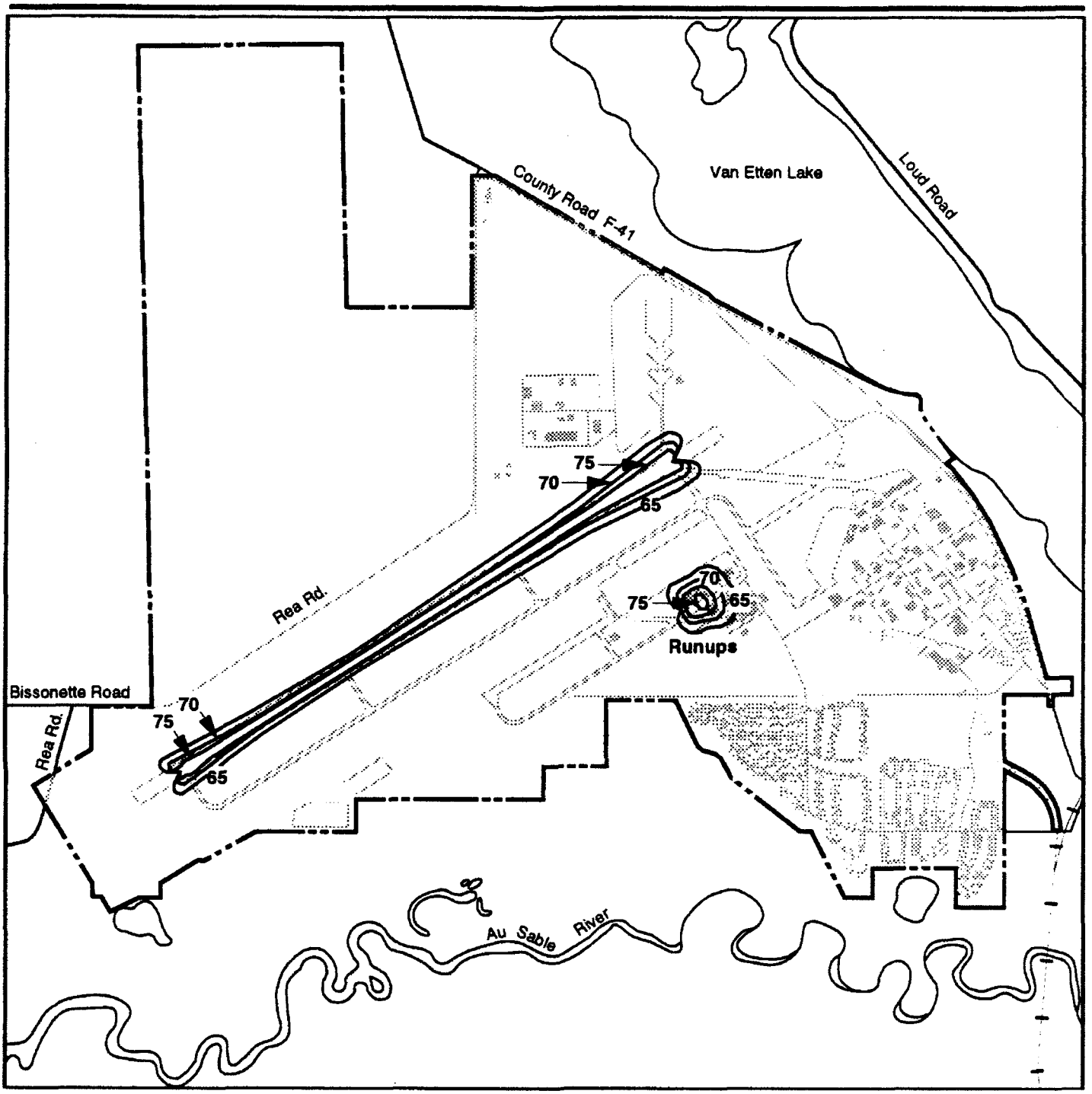
EXPLANATION

- Base Boundary
- DNL Noise Contours (in 5dB intervals)

DNL Noise Contours - Proposed Action (2003)

0 750 1500 3000 Feet

Figure 4.4-3



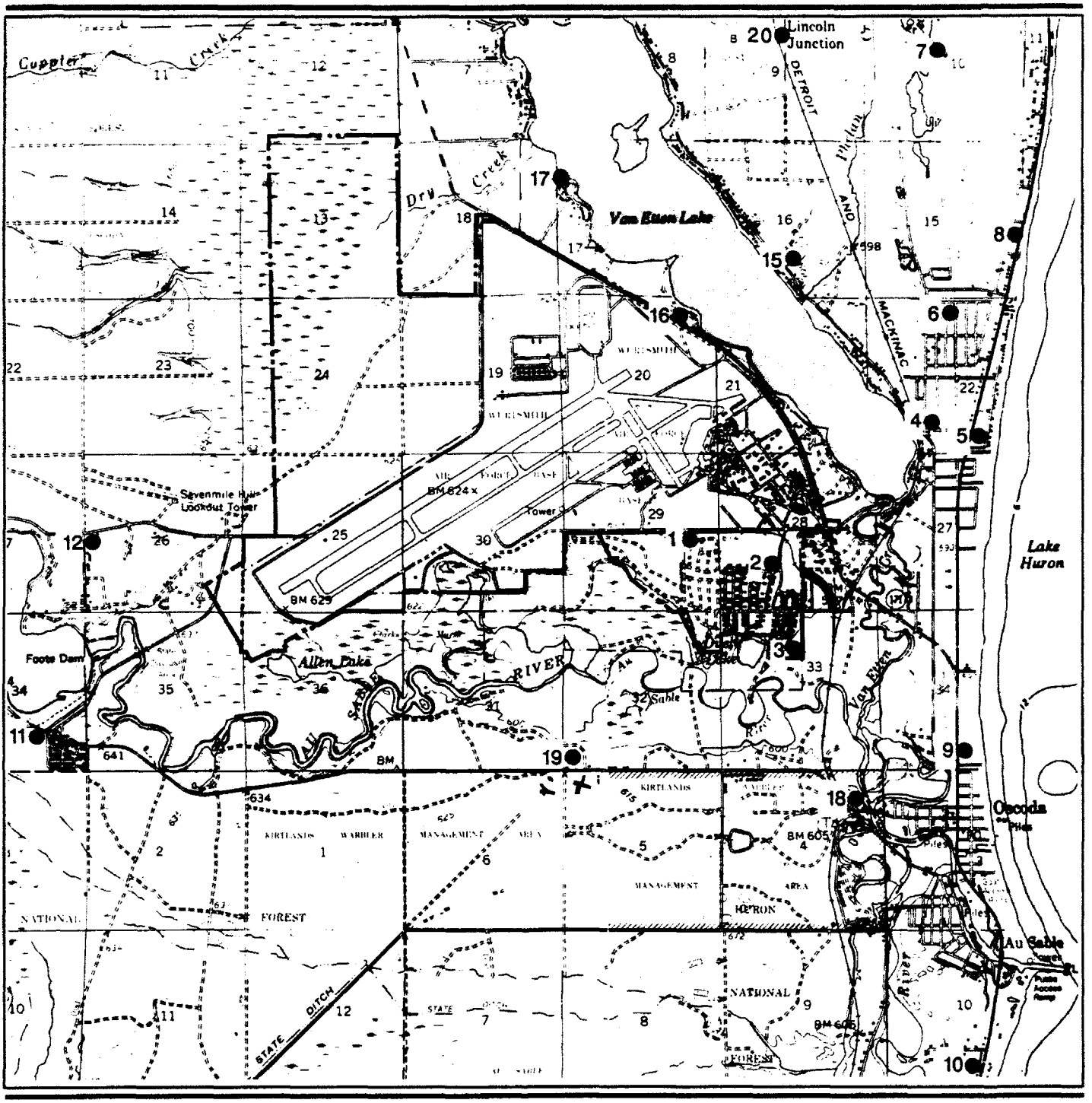
EXPLANATION

- Base Boundary
- DNL Noise Contours (in 5dB intervals)

DNL Noise Contours - Proposed Action (2013)

0 750 1500 3000 Feet

Figure 4.4-4



EXPLANATION

Base Boundary

SEL Receptor Location

Note: 2 SEL locations are not shown (in northern Rural Oscoda County)

Sound Exposure Level (SEL) Receptor Locations

0 1250 2500 5000 Feet

Note: Numbers correspond to numbered entries on Table 4.4-12.

Map Source: U.S. Geological Survey, 1988a, 1988b.

Figure 4.4-5

Table 4.4-12. Sound Exposure Levels at Representative Noise Receptors from Aircraft Operations - Proposed Action

Receptor No.[a]	Community	Receptor Location	Sound Exposure Level (dB) Aircraft Type				
			727-200	727-200 re-engined	DC-8-50	747-400	Learjet 35
1	On Base	NW corner of base housing	85	81	85	80	72
2	On Base	NE corner of base housing	81	78	79	76	66
3	On Base	SE corner of base housing	77	73	74	72	60
4	Oscoda	Residential area at Cedar Lake Rd. and Loud Rd.	84	81	81	77	69
5	Oscoda	Residential area at Jordanville Rd. and U.S. 23	81	78	79	75	66
6	Oscoda	Trailer park north of Huron Church	91	86	88	81	76
7	Oscoda	Residential area at South End of Cedar Lake Rd.	92	87	89	81	76
8	Oscoda	Residential area North of Roadside Park on U.S. 23	93	89	96	83	78
9	Oscoda	Residential area at Evergreen St. and U.S. 23	70	67	65	66	51
10	Au Sable	Residential area at Johnson Rd. and U.S. 23	60	58	56	59	40
11	Foote Site Village	Residential area at Rea Rd. and River Rd.	102	96	104	95	83
12	Rural Oscoda County	Residential area at Alvin Rd. and Bissonette Rd.	88	85	86	80	73
13	Rural Oscoda County	Residential area at U.S. 23 at County Line	79	77	77	72	64
14	Rural Oscoda County	Residential area, F-41 at County Line	63	61	59	61	44
15	Rural Oscoda County	Residential area at Loud Rd. directly off runway	105	102	107	98	88
16	Rural Oscoda County	Residential area north of Air Force Beach	107	104	106	97	92
17	Rural Oscoda County	Recreational at Camp Nissokone	85	83	84	80	72
18	Rural Oscoda County	Residential area at River Rd. and Michigan St.	70	67	66	65	51
19	Rural Oscoda County	Residential area at Kennedy Rd. and River Rd.	75	73	75	72	61
20	Rural Oscoda County	Residential area at Lincoln Junction	84	80	82	76	69

Note: (a) Numbers correspond to numbered locations on Figure 4.4-5.

distance from the centerline of the roadways analyzed. An estimated 1,409 people would live in areas exposed to noise levels of DNL 65 dB or greater due to surface traffic by the year 2013, an increase of 12 percent (156 people) from No-Action Alternative projections for that year. Most of these affected residents would be living along U.S. 23 through Oscoda and Au Sable.

Mitigation Measures. No mitigation measures would be necessary for aircraft noise, because no incompatible land uses have been identified.

Several methods could be used to mitigate surface traffic noise along roadways with impacts. Barrier walls could be constructed; additional analysis would be necessary to determine the optimum locations, height, and/or feasibility of the barrier wall. A sound insulation program could be implemented to reduce interior noise levels for sensitive receptors exposed to DNL 65 dB or greater. Land use planning for future development should incorporate noise compatibility measures when establishing residential zoning. Measures such as restricting residential development to areas outside DNL 65 dB and incorporating barriers and buffer zones into community development can be used. The effectiveness of the operational and management noise mitigation measures presented here cannot be completely determined without extensive modeling and/or noise measurements.

4.4.4.2 Fire Training Alternative. For this alternative, there would be no airport activity and, therefore, no aircraft noise impacts.

Surface traffic sound levels are presented by representative year in Appendix J. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed. By the year 2013, an estimated 1,392 people would live within areas exposed to DNL 65 dB and above, primarily along U.S. 23 through Oscoda and Au Sable. This represents an increase of 11 percent (139 people) over No-Action Alternative projections for that year.

Mitigation Measures. Mitigations to reduce surface traffic noise would be the same as those discussed for the Proposed Action.

4.4.4.3 Recreation Alternative. For this alternative, there would be no airport activity and, therefore, no aircraft noise impacts.

Surface traffic sound levels are presented by representative year in Appendix J. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed. By the year 2013, an estimated 1,321 people would live within areas exposed to DNL 65 dB and above, primarily along U.S. 23 through Oscoda and Au Sable. This

represents an increase of 5 percent (68 people) over No-Action Alternative projections for that year.

Mitigation Measures. Mitigations to reduce surface traffic noise would be the same as discussed for the Proposed Action.

4.4.4.4 No-Action Alternative. There would be no airport activity and minimal surface traffic under the No-Action Alternative. Surface traffic sound levels are presented in Appendix J. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed. In 1993, an estimated 682 people would live within areas exposed to DNL 65 dB and above. This number would increase to 1,253 people by 2013, primarily due to increased traffic and associated noise levels along U.S. 23 through Oscoda and Au Sable.

4.4.4.5 Other Land Use Concepts. Implementation of the Advanced Environmental Technology Facility would not create additional noise impacts.

4.4.5 Biological Resources

The Proposed Action and reuse alternatives could potentially affect biological resources through alteration or loss of vegetation and wildlife habitat. These impacts are described below for each alternative.

Assumptions used in analyzing the impacts of the Proposed Action and alternatives include:

- All staging and other areas temporarily disturbed by construction, demolition, and renovation would be placed in previously disturbed areas (e.g., paved or cleared areas) to the fullest extent possible.

- Proportions of disturbance associated with each land use category were determined based on accepted land use planning concepts. Development within each parcel could occur at one or more designated locations anywhere within that category.

4.4.5.1 Proposed Action. The Proposed Action would have minimal impacts on biological resources. It is estimated that 551 acres would be disturbed over a 20-year period by facility construction, demolition, and renovation; infrastructure improvements; and vegetation removal and maintenance. The areas with the historically highest levels of activity are designated for reuse activity. Most of the large undisturbed areas on base would remain intact.

Vegetation. The Proposed Action would result in a potential disturbance of 551 acres from construction, demolition, and renovation activities by the

year 2013. Most of this disturbance would occur within low-quality habitat (e.g., in landscaped areas or small areas of disturbed forest), although some limited disturbance may occur in forested areas along the southern base boundary. Due to the low quality of the vegetation to be disturbed, the impacts are expected to be minimal.

Under the Proposed Action, the 617-acre forested area in the northwestern part of the base, which includes a large cedar swamp, would remain undeveloped as a conservation area. Preservation of this ecologically valuable area would be a beneficial impact. Effects from recreational use (hiking, camping, hunting) in this area would be limited and similar to those in the adjacent state and national forest areas.

Air Force Fee-Owned Land. Proposed Action activities would cause minor impacts to vegetation on Air Force fee-owned land as a result of ground disturbance, but the majority of the vegetation has been previously disturbed and is of low quality. No disturbing activities are planned near the wetlands on Air Force fee-owned land at the southwestern end of the runway.

Wildlife. Effects on wildlife would be related to habitat loss, demolition activities, and operations.

Species that would be immediately affected by a loss or alteration of landscaped areas and small forested areas include those that are sedentary or have relatively small home ranges such as some nesting birds (e.g., American woodcock and field sparrow), mammals (e.g., fox squirrel, masked shrew, and woodchuck), amphibians, and reptiles. The loss of habitat could also affect wider-ranging species that forage in the area such as raptors (e.g., red-tailed hawk, American kestrel, and great-horned owl) and predatory mammals (e.g., coyote and gray fox). Because of the low habitat value, however, these impacts are expected to be minimal.

Activity and noise associated with demolition and renovation would have short-term effects on local wildlife in adjacent areas by causing individuals of species intolerant of such disturbance to avoid the area. Noise, activity, and lighting associated with operation of the airport and industrial and/or commercial facilities would continue to discourage intolerant species and attract tolerant species. Noise impacts would generally be less than those experienced under preclosure conditions. Although some startle effects may occur as a result of increased activity from closure, species currently residing in overflight areas would be expected to become tolerant to the noise associated with civilian aircraft. Effects from recreational use (hiking, camping, hunting) in this area would be limited and similar to those in the adjacent state and national forest areas. Noise impacts on wildlife are expected to be minimal.

Air Force Fee-Owned Land. The majority of Air Force fee-owned land has low habitat value for wildlife, but there could be minor effects associated with ground disturbance, as discussed above.

Threatened and Endangered Species. No federally or state-listed threatened or endangered species are expected to be impacted by the Proposed Action (letter from U.S. Fish and Wildlife Service is in Appendix L). The 69 acres of wetlands along the Au Sable River floodplain are habitat to the massasauga rattlesnake, a federal candidate for listing as threatened or endangered, which could be disturbed by recreational uses. The disturbance of its habitat is expected to be minimal. Lake cress, a plant listed by the state as threatened and a federal candidate for listing, and wild rice, a state-listed threatened species, may both occur downstream along the Au Sable River. No indirect effects to their downstream environment are expected as a result of Proposed Action activities. These two plant species have not been recorded on the base.

Air Force Fee-Owned Land. Wetland habitat is present on Air Force fee-owned land at the southeastern end of the runway. However, no activities are planned in this area that would disturb the wetlands.

Sensitive Habitats. The large wetland in the northwest part of the base would be left undeveloped as a conservation area. Depending on the management objectives for this area, any impacts would most li. ly be beneficial. Effects from recreational uses of this area would be limited and similar to those in the adjacent state forest areas.

Along the Au Sable River floodplain, 69 acres of wetlands could potentially be affected by activities of the Proposed Action. Increased recreational use of the area could cause minor disturbance to wetland vegetation. Because the terrain is relatively flat and the soils permeable, indirect impacts to downstream off-base wetlands from activities on the base would also be minimal.

Air Force Fee-Owned Land. A portion of the wetlands at the southwest end of the runway is on Air Force fee-owned land, but no activities are planned in this area that would cause disturbance to these wetlands.

Mitigation Measures. Avoidance of pristine forest or wetland areas on Wurtsmith AFB would result in minor or no impacts to vegetation and wildlife and no mitigation would be required.

Reuse activities affecting wetlands would be subject to Section 404 of the Clean Water Act, and Michigan's Goemaere-Anderson Wetland Protection Act, as appropriate. Wetlands on U.S. Forest Service property would be protected in compliance with Executive Order 11990. Mitigations could include avoidance of direct or indirect disturbance of wetlands through

appropriate land use planning. Avoidance of disturbance could include controlling runoff from demolition sites into drainages through the use of berms, silt curtains, straw bales, and other appropriate techniques. Equipment could be washed in areas where wash water could be contained and treated or evaporated.

Protection of wetland areas should suffice to protect potential habitat for candidate species (massasauga, lake cress, and wild rice) that require wetland habitat for their survival.

4.4.5.2 Fire Training Alternative. Under this alternative, a total of 351 acres could potentially be disturbed. The major areas of disturbance would be associated with fire training activities along the airfield and with development of new industrial and commercial facilities in the cantonment.

Fire training activities could potentially present impacts to biological resources. Forest fire training activities, which would be conducted in conjunction with MDNR and the U.S. Forest Service, have the potential to cause impacts to forest and wetland areas in the northwestern portion of the base. However, these activities would be planned to burn only 1 to 2 acres per year, and would be conducted under suitable conditions to control the fire. Structural and chemical fire training would be conducted on the runway and taxiway areas, and fire fighting water contaminated with fuels and fire fighting agents would be channeled in a lined collection system, passed through an oil/water separator, and stored for reuse in a double-lined, 10-million-gallon retention pond.

Vegetation. Impacts to landscaped, disturbed grassland, and small forested areas are expected to be minimal in terms of biological value.

Educational uses associated with the fire training facility may occur in disturbed grasslands, developed areas, forested cover, or swamp/marsh areas. Disturbance to vegetated areas from fire training activities would most likely result from prescribed forest fires within the forested cover in the northwestern part of the base. A remote potential exists that a prescribed fire would escape control and burn areas not intended to be burned. With careful management of prescribed fires, however, impacts to vegetation would be positive. Benefits of prescribed fires include an overall reduction of the risk of catastrophic forest fire occurrences. Prescribed burns tend to remove dead debris from the forest floor that could ignite under uncontrolled conditions. The periodic removal of debris makes a prescribed fire generally burn cooler than wildfires, thereby often preserving the forest canopy, perennial plant roots, and soil structure. Burning of forests controls diseases; creates light gaps where shade-intolerant seedlings, including jack pine, can become established; and assists in dissemination of seeds. These seedlings could therefore become established in a mosaic pattern with

larger, more mature stands. Under this scenario, an increase in vegetative species diversity is possible.

Air Force Fee-Owned Land. There would be few, if any, impacts to vegetation on Air Force fee-owned land because little ground disturbance is planned in those areas and the majority of the vegetation has been previously disturbed and is of low quality. No disturbing activities are planned near the wetlands on Air Force fee-owned land at the southwestern end of the runway.

Wildlife. With the exception of forest fire training activities, the effects of habitat alteration and loss on wildlife under the Fire Training Alternative would be similar to those described in the Proposed Action, but no aviation noise would disturb wildlife under this alternative.

A potential for disturbance to wildlife habitat exists as a result of the forest fire training activities associated with this alternative. An increase of fires and related activities in the northwestern portion of the base would reduce forest habitat in the short term. This could result in the mortality of less mobile species (including the wood turtle, designated by the State of Michigan as a Species of Special Concern), as well as the displacement of mobile species. The openings created by prescribed fires would, however, provide increased habitat for wildlife such as white-tailed deer and wild turkey. During prescribed burns the possibility exists that an unusual event could cause a large-scale forest fire, with short- to long-term effects. However, this risk would be offset by the forest fire prevention benefits of prescribed fire as described above. Species that would be most adversely affected by an escaped prescribed fire include inhabitants of mature forests such as the pileated woodpecker, northern saw-whet owl, and the northern flying squirrel.

Activity and noise associated with aircraft would decrease compared to the preclosure condition. Temporary noise sources associated with demolition and construction would have short-term, minor impacts similar to those described for the Proposed Action. Wildlife species intolerant of such disturbance would avoid the vicinity of the project during the time of the activity, but impacts on their populations would be minimal.

Residual amounts of fuels (e.g., propane and gasoline used to create practice fires) as well as chemical fuels, such as magnesium and aluminum, could be present in the water retention pond. Open water attracts waterfowl and thirsty animals. The pond water may not be suitable for consumption or other use by animals.

Air Force Fee-Owned Land. The Air Force fee-owned land presents little habitat for wildlife, and little ground disturbance is planned; so effects would be minimal.

Threatened and Endangered Species. Although the endangered Kirtland's warbler does not exist on Wurtsmith AFB, regeneration of jack pine stands after prescribed fires may result in a beneficial impact by creating habitat favorable for the Kirtland's warbler. Continuous fire management activities in this area have the potential to create small 5- to 20-year-old stands of jack pine, the habitat requirement for the Kirtland's warbler. As these stands increase in age beyond 20 years, new seedlings would become established and fall into the 5- to 20-year-age class in nearby areas. If allowed to occur over time, these activities could ensure continued generation of Kirtland's warbler habitat within the educational land use zone. As under the Proposed Action, impacts to the massasauga, lake cress, and wild rice are expected to be minimal.

Air Force Fee-Owned Land. Wetland habitat is present on Air Force fee-owned land at the southwestern end of the runway, but no activities are planned in this area that would disturb the wetlands.

Sensitive Habitats. There is a remote potential for wetland habitat to be disturbed as a result of prescribed fires escaping into wetland areas in the northwest portion of the base. However, this potential risk is largely offset by higher fuel moistures found there and, thus, reduced risk of an uncontrolled, unmonitored ignition in fuels found in the planned burn areas. Potential beneficial impacts of burning wetland areas could occur through the removal of dead plant material, thereby opening the wetland for new growth and increased productivity. Impacts from sedimentation and runoff of ash deposits as a result of prescribed fires may slightly increase nutrient loading into the forested and the Dry Creek wetland areas. However, leaching of nutrients through permeable sandy soils and the relatively flat slope of the area would tend to minimize this effect.

Impacts from this alternative on wetlands in other areas of the base would tend to be similar to those experienced under the Proposed Action.

Air Force Fee-Owned Land. A portion of the wetlands at the southwest end of the runway is on Air Force fee-owned land, but no activities are planned in this area that would cause disturbance to these wetlands.

Mitigation Measures. Mitigation would be the same as for the Proposed Action, with the following additions:

- Wetland areas that abut wildland fire training areas should be protected by a vegetative buffer designed to minimize ash and sediment runoff into these areas.

- Prescribed burning could be managed to enhance biodiversity by creating a mosaic of areas burned at different times and consequently having different stages of vegetation development throughout the area. Management activities should focus on

maintaining 5- to 20-year-old stands of jack pine, if possible, to enhance habitat for the Kirtland's warbler.

- Prior to initiation of prescribed burning activities, the burn area and immediate vicinity could be inspected for wood turtles. If wood turtles were found on site, they could be transported by qualified wildlife biologists to safer habitat.

- The fire fighting water retention pond should be enclosed and covered to discourage wildlife from drinking the water, which could contain potentially harmful substances.

4.4.5.3 Recreation Alternative. The Recreation Alternative could potentially have an overall positive impact on biological resources, although negative impacts could occur at individual sites. Over 90 percent of the base would be set aside for public open space and recreation uses. Disturbance would largely be limited to the existing cantonment area.

Vegetation. Under this alternative, up to 614 acres would potentially be disturbed by such land uses as a golf course, recreational vehicle park, and other recreational facilities. Relative impacts to vegetation would be minimal in the cantonment area, where most of the disturbance would occur in landscaped areas or disturbed grassland. Some construction could occur in areas that are forested, but these areas are small and are already disturbed. Impacts in these smaller stands are expected to be minimal. The large forested tract in the northwestern portion of the base would remain undeveloped as a conservation area, resulting in a beneficial impact. Effects from recreational uses (hiking, camping, and hunting) of this area would be limited and similar to those in the adjacent state and national forest areas.

Air Force Fee-Owned Land. There could be minor impacts to vegetation on Air Force fee-owned land as a result of ground disturbance, but the majority of the vegetation has been previously disturbed and is of low quality.

Wildlife. Effects of habitat alteration and loss would be similar to those of the Proposed Action. Under the Recreation Alternative, some disturbances would create positive impacts to wildlife in the long term. Activities under the Recreation Alternative would occur largely in areas that are already disturbed and impacts would be minimal. Noise and activities associated with demolition and construction would have impacts similar to those described for the Proposed Action. Effects from recreational uses (hiking, camping, and hunting) of this area would be limited and similar to those in the adjacent state and national forest areas.

Air Force Fee-Owned Land. The majority of habitat on Air Force fee-owned land has low value for wildlife, but there could be minor effects associated with ground disturbance and human activity, as discussed above.

Threatened and Endangered Species. Effects on sensitive species from this alternative are expected to be similar to those in the Proposed Action.

Air Force Fee-Owned Land. Wetland habitat is present on Air Force fee-owned land at the southwestern end of the runway but no activities are planned in this area that would disturb the wetlands.

Sensitive Habitats. Effects on sensitive habitats are expected to be similar to those described under the Proposed Action depending on location. Effects from recreational uses (hiking, camping, and hunting) of this area would be limited and similar to those in the adjacent state and national forest areas. Pesticide- and fertilizer-contaminated runoff from the proposed golf course could flow into on- and off-base wetlands, possibly affecting native plants and animals. The potential for this is low, however, based on the relatively flat terrain, permeable soils, and relatively rapid chemical breakdown of applied pesticides and fertilizers in the environment.

Air Force Fee-Owned Land. A portion of the wetlands at the southwest end of the runway is on Air Force fee-owned land, but no activities are planned in this area that would cause disturbance to these wetlands.

Mitigation Measures. Mitigation measures would be similar to those discussed for the Proposed Action.

4.4.5.4 No-Action Alternative. Maintenance of the base would have minimal adverse effects on biological resources. A reduction in human activity and a cessation of aircraft flights would reduce disturbance to wildlife on and in the vicinity of the base. Habitat quality for wildlife could improve if mowing of nonlandscaped areas were terminated, thereby allowing vegetation to grow to a height that would greatly benefit wildlife species.

4.4.5.5 Other Land Use Concepts. Disturbances caused as a result of population influx under the Advanced Environmental Technology Facility would be minimal, and impacts to biological resources would be negligible.

4.4.6 Cultural Resources

Potential impacts were assessed by (1) identifying types and possible locations of reuse activities that could directly or indirectly affect cultural resources, and (2) identifying the nature and potential significance of cultural resources in the potentially affected areas. Pursuant to the NHPA, consultation, as directed by the Section 106 review process, has been initiated with the Michigan SHPO. Initially, the SHPO indicated that "the project [disposal and reuse of the base] will affect no historic properties (no known sites eligible for listing in the *National Register of Historic Places*) and that the project is cleared under federal regulation 36 CFR 800 for the

"Protection of Historic Properties." Subsequently, after further research, the SHPO withdrew this finding, and recommended further investigations (Appendix L).

Historic properties, under 36 CFR 800, are defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP. This term includes, for the purposes of these regulations, artifacts, records, and remains that are related to and located within such properties. The term 'eligible for inclusion in the National Register' includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet National Register listing criteria." Therefore, sites not yet evaluated are considered potentially eligible to the NRHP and, as such, are afforded the same regulatory consideration as nominated historic properties, or properties actually on the NRHP.

As a federal agency, the Air Force is responsible for identifying any historic properties at Wurtsmith AFB. This identification process includes not only field surveys and recording of cultural resources, but also evaluations to develop determinations of significance in terms of NRHP criteria. (NRHP criteria and related qualities of significance are discussed in Appendix E, Methods of Analysis.) Completion of this process results in a listing, if applicable, of historic properties subject to federal regulations regarding the treatment of cultural resources.

The identification process as defined by the NHPA is currently ongoing at Wurtsmith AFB. The reconnaissance survey is complete. The Air Force will engage in further consultation with the SHPO to complete the Air Force's responsibilities under Section 106 of the NHPA. The Air Force will place appropriate restrictions on the one unevaluated archaeological site (201s98), until it can be evaluated, and until the Section 106 consultation process is complete.

4.4.6.1 Proposed Action. The lithic scatter (201s98) lies within property leased from the U.S. Forest Service. After base closure, the site would remain under federal jurisdiction, and thus would be subject to the consideration afforded by federal regulations. Under the Proposed Action, the site would be located within a public facilities/recreation area. Because only a small proportion of this parcel would be disturbed under this reuse scenario, it is possible that avoidance of the site would be feasible.

Due to the lack of significant historic structures and resources, traditional resources, and paleontological resources on Wurtsmith AFB, reuse under the Proposed Action would have no effect on these types of cultural resources.

Mitigation Measures. Since the potential historic property would remain under federal control, any development within the parcel that could impact

the site would, therefore, fall under the requirements of Section 106 of the NHPA. Mitigation measures may be developed that meet the Secretary of the Interior's Standards and Guidelines for Historic Preservation Projects (36 CFR 68), or Archaeology and Historic Preservation (48 CFR 190). These mitigation measures could include avoidance, stabilization, preservation in place, or data recovery.

The Air Force will consult with the SHPO and the Advisory Council on Historic Preservation to implement an appropriate mitigation approach, if one is required. Consultation will proceed in compliance with Section 106 of the NHPA and its implementing regulations (36 CFR 800). A Memorandum of Agreement may be developed to document the accepted mitigations. Additionally, the archaeological site investigations described in 3.4.6 are an indication there may be some potential for other archaeological sites or remains within the boundaries of the base. Therefore, the following additional mitigation measures are suggested until a Memorandum of Agreement is finalized.

- Prior to any digging or excavating, the Air Force should be notified.
- During any digging or excavating, care should be exercised in case archaeological artifacts or remains are encountered.
- If archaeological artifacts or remains are encountered during an excavation, work must be stopped and the Air Force and the SHPO must be notified.

4.4.6.2 Fire Training Alternative. Under this alternative, impacts to cultural resources would be the same as those discussed under the Proposed Action, with the following exception. The recorded archaeological site, 201s98, would be located along the border of the institutional (education) and public facilities/recreation land use parcels.

Mitigation Measures. Appropriate mitigation measures would be the same as those outlined for the Proposed Action.

4.4.6.3 Recreation Alternative. Under this alternative, impacts to cultural resources would be the same as those discussed under the Proposed Action.

Mitigation Measures. Appropriate mitigation measures would be the same as those outlined for the Proposed Action.

4.4.6.4 No-Action Alternative. There would be no effect on cultural resources resulting from the implementation of the No-Action Alternative. The OL should continue to ensure adequate security to discourage illegal

looting of the archaeological site, and thus inadvertent violation of the Archaeological Resources Protection Act.

4.4.6.5 Other Land Use Concepts. There would be no effect on cultural resources from the establishment of the Advanced Environmental Technology Facility.

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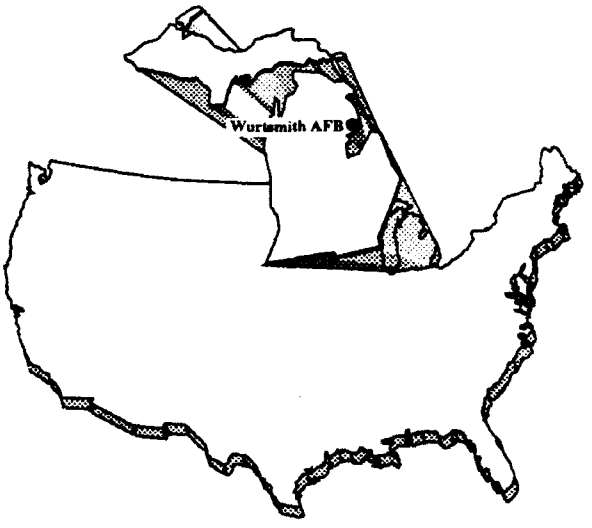


CHAPTER 5
CONSULTATION AND COORDINATION

5.0 CONSULTATION AND COORDINATION

The federal, state, and local agencies and private agencies/organizations that were contacted during the course of preparing this EIS are listed below.

FEDERAL AGENCIES

Advisory Council on Historic Preservation
Federal Aviation Administration
Federal Highway Administration
United States Department of Agriculture, Forest Service
United States Department of Agriculture, Soil Conservation Service
United States Department of the Interior
United States Fish and Wildlife Service

STATE AGENCIES

Great Lakes Fire Training Academy
Michigan Commission on Indian Affairs
Michigan Department of Commerce, Wurtsmith Base Conversion Agency
Michigan Department of Natural Resources
Michigan Department of Transportation
Michigan Employment Security Commission
Michigan Fire Fighters Training Council
Michigan Natural Features Inventory
Michigan Office of Tax and Revenue Analysis
Michigan Public Health Department
Michigan State Historic Preservation Office
Michigan Transportation Commission
Michigan Travel Bureau
Saginaw Valley State University

LOCAL/REGIONAL AGENCIES

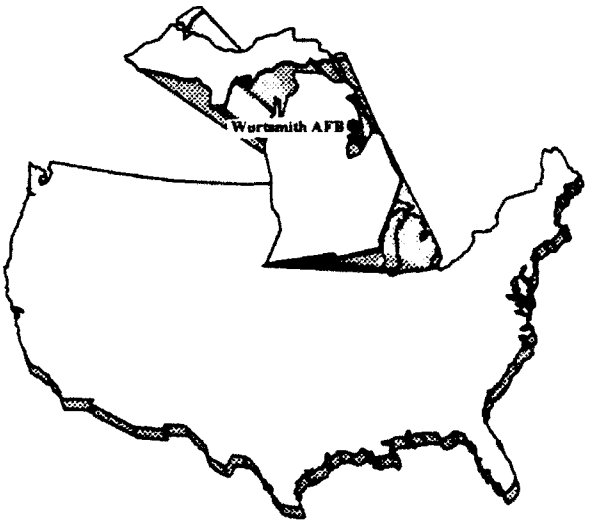
Alcona County Building and Housing Office
Alcona County Sheriff's Department
Alpena Community College
Arenac County Housing Commission
Arenac County Sheriff's Department
Au Sable Township

LOCAL/REGIONAL AGENCIES (Continued)

East Tawas Fire Department
Greenbush Township
Iosco County Airport
Iosco County Board of Commissioners
Iosco County Building Permit Public Counter
Iosco County Housing Commission
Iosco County Road Commission
Iosco County Sheriff's Department
Iosco Intermediate School District
Office of Economic Adjustment (Oscoda Township)
Oscoda Area Schools
Oscoda Township
Oscoda Township Fire Department
Oscoda Township Police Department
Tawas Area School District
Tawas City
Tawas City Fire Department
Tawas Utility Authority
Wurtsmith Area Economic Adjustment Commission

PRIVATE ORGANIZATIONS AND INDIVIDUALS

Consumers Power Company
First of America Bank
Hager Sanitation Service
Heritage House Realty
Iosco County Transit Corporation
ITT Higbie Baylock
Lake State Railway Company
Lakewood Shores Golf Course
Lakewood Shores Property Owners Association
Michigan Consolidated Gas Company
Michigan Sunrise Side, Inc.
Oscoda-Au Sable Chamber of Commerce
Redwood Motor Lodge
Target 2000
Tawas Area Chamber of Commerce
The Straits Corporation
White Feather Development
Williams and Works Operation Services



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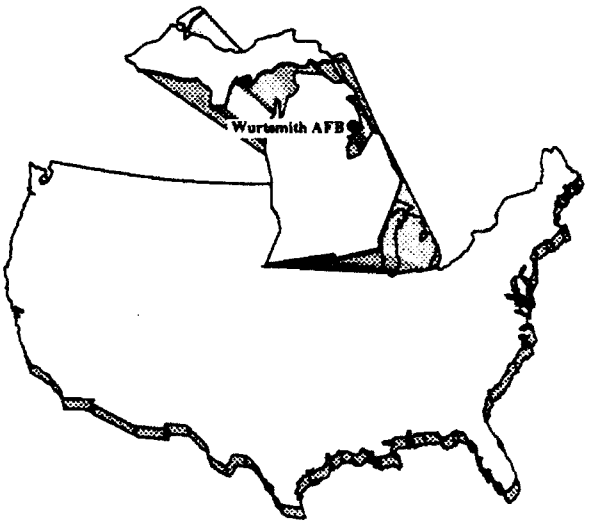

CHAPTER 7
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CHAPTER 8
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8.0 INDEX

CHAPTER 9
PUBLIC COMMENTS AND RESPONSES

9.0 PUBLIC COMMENTS AND RESPONSES

INTRODUCTION

The Air Force has complied with the NEPA mandate of public participation in the EIAP primarily in three ways:

- A scoping meeting was held in Oscoda, Michigan, on November 7, 1991, at which the Air Force reviewed the EIAP and invited public input regarding the disposal and reuse of Wurtsmith AFB.

- A public hearing was held in Oscoda, Michigan, on April 5, 1993, at which the Air Force presented the findings of the DEIS for disposal and reuse of Wurtsmith AFB and invited public comments.

- The subject DEIS was made available for public review and comment during March and April 1993.

Public comments received both verbally at the scoping meeting and public hearing, and in writing during the response period, have been reviewed and are addressed by the Air Force in this section.

ORGANIZATION

This Public Comment and Response section is organized into several subsections, as follows:

- This Introduction, which describes the process, organization, and approach taken in addressing public comments

- A consolidated comment-response document

- An index of commentors

- A transcript of the public hearing

- Photocopies of all written comments received.

These sections are described below.

Some comments simply state a fact or an opinion, for example, "the DEIS adequately assesses the impacts on [a resource area]." Such comments, although appreciated, do not require a specific response and are not called out herein. The comments and responses are grouped by area of concern, as follows:

1.0 Air Force Policy

2.0 Purpose of and Need for Action

3.0 Alternatives Including the Proposed Action

4.0 Land Transfer/Disposal

5.0 Local Community

6.0 Land Use/Aesthetics

7.0 Transportation

8.0 Airspace

9.0 Utilities

10.0 Hazardous Materials/Waste Management

11.0 Soils and Geology

12.0 Water Resources

13.0 Air Quality

14.0 Noise

15.0 Biological Resources

16.0 Cultural Resources

17.0 Socioeconomic Impact Analysis Study

Within each area, each comment-response is numbered sequentially. For example, under 9.0 Utilities, individual comments-responses are numbered 9.1, 9.2, etc. At the end of each numbered comment is a set of numbers that refers to the specific comment in the documents received, e.g., (6-8). Comment 6-8, for example, refers to document 6, comment number 8. A reader who wishes to read the specific comment(s) received may turn to the photocopies of the documents included in this section. Below each comment number is the number of the specific comment-response within the area of concern, e.g. 7.5. Thus, the reader may reference back and forth between the comments-responses and the specific comment documents as they were received.

Finally, it should be emphasized that not only have responses to EIS comments been addressed in this comment-response chapter, as explained, but the text of the EIS itself has also been revised, as appropriate, to reflect the concerns expressed in the public comments.

The list of commentors includes the name of the commentor, the identifying document number that has been assigned to it, and the page number in this section on which the photocopy of the document is presented.

1.0 AIR FORCE POLICY

1.1 Comment: The DEIS only contains three coordination letters. National Environmental Policy Act environmental assessment procedures require more extensive coordination with federal, state, and local agencies and interest groups than is evident in Appendix L. (2-3)

Response: Chapters 1 and 2 describe in detail the Air Force consultation and coordination process for closure and disposal. Chapter 5, Consultation and Coordination, lists the various agencies contacted by the Air Force in the preparation of the DEIS. Coordination letters are included only for resources for which formal federal or state agency concurrence is required by law (e.g., USFWS coordination regarding threatened and endangered species, and consultation with SHPO).

1.2 Comment: Any money the Air Force receives from lease agreements should go towards environmental clean-up. (3-1)

Response: The IRP and other environmental programs are funded by the Department of Defense. Federal law (10 U.S.C. §2667) sets forth into which accounts the money rentals received from the interim leasing of nonexcess property are deposited and how these monies may be used. A designated percentage of the rentals is available for environmental restoration.

1.3 Comment: The review period for the document is inadequate and does not allow volunteer citizen's groups such as those I represent sufficient time to properly evaluate its content and prepare detailed comments. (9-1)

Response: The 45-day review period was chosen because it is the standard promulgated by the CEQ guidelines.

1.4 Comment: The failure to include in the DEIS comments submitted at the EIS Scoping Meeting, held on November 7, 1991, in Oscoda is reason for concern, especially in that the Air Force claims that said comments have played an important role in the formulation of the DEIS. As one who attended and commented at that meeting, I feel that it is essential that the remarks made by a broad representation of community interests on that occasion be part of the DEIS document. (9-2)

Response: All scoping comments within the scope of this EIS have been addressed in the respective sections of this FEIS, as required by NEPA and Air Force regulations. Comments received on the DEIS are included in the FEIS, in accordance with NEPA.

1.5 Comment: Why was the Citizen's Advisory Committee on Wurtsmith AFB Contamination excluded from the Consultation and Coordination list? The Citizen's Advisory Committee has been very active in its role of keeping the public informed about the toxic contamination at and emanating from Wurtsmith AFB. The failure of the Air Force to work with this citizen's group is most unfortunate and unwarranted, especially in light of the fact that the Air Force Technical Review Committee has a policy of excluding citizens and media from attending and participating in its meetings. (9-3, 9-4)

Response: The Air Force is aware of public concern regarding contamination at the base, and communicates with the public and appropriate agencies regarding these issues under the IRP, as discussed in Section 3.3.3.

1.6 Comment: The EIS document fails to comment on the refusal of the Department of Defense to sign the September 1992 consent agreement proposed by the Michigan Attorney General and the MDNR. The consent agreement was intended to serve as a legal blueprint for the clean-up of toxins at Wurtsmith AFB, establishing the responsibility and methodology for the remediation of all the contaminated sites and ensuring environmental restoration in accordance with the standards and guidelines of Michigan Act 307c. (9-6)

Response: The Air Force is committed to the cleanup of hazardous substances (including toxins) and ensuring compliance with CERCLA through its IRP. The Air Force continues its groundwater remediation activities in compliance with the 1980 Consent Decree between the Air Force and MDNR. These remediation activities are now part of the IRP at Wurtsmith. There is a disagreement between the Air Force and the Michigan Attorney General's Office as to the necessity and form of any new agreement.

2.0 PURPOSE OF AND NEED FOR ACTION

No comments were received for this area of concern.

3.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

3.1 Comment: There is little information regarding federal government plans regarding housing and other federal properties. (5-3)

Response: As stated in Chapter 1, only 42 percent of the base is fee-owned by the Air Force and available for direct federal disposal. As indicated in Chapter 2, the Air Force has notified other federal agencies, including the Department of Housing and Urban Development, that Wurtsmith AFB is scheduled for disposal. To date, no federal agencies have expressed an interest in acquiring properties on Wurtsmith AFB. The DEIS is prepared to provide the decision maker with a clear understanding of the potential environmental impacts of disposal and reuse; actual development plans and final recipients of the properties have not been determined at this time.

3.2 Comment: Objective comparison of alternatives is difficult due to the fact that information concerning the implementation costs and level of benefit for each alternative is lacking. The basis for selecting the preferred alternative should be firmly established and clearly presented. (8-1)

Response: The EIS addresses only potential environmental impacts of reuse alternatives. Implementation costs, selection of a preferred alternative, and other factors involved in the disposal and reuse decisions are considered by the decision-makers, but are outside the scope of the EIS.

3.3 Comment: No information is presented to support the likelihood of securing an "aircraft refurbishing and maintenance facility" as a tenant despite the fact the DEIS assumes, without foundation, that this will occur. No information is presented concerning the projected demand for "light industrial" properties in the region of impact, additional commercial or institutional facilities, or dwelling units. (8-2)

Response: As discussed in Section 2.2, the Air Force has adopted the community's reuse plan as the Proposed Action and developed other reasonable alternatives for analysis. The EIS addresses only

the potential environmental impacts of the Proposed Action and alternatives, not the market demand or likelihood of occurrence. The environmental impact analysis was designed to address the scope of what may occur over a 20-year period. Less intense development would, therefore, be considered within the scope of this analysis.

3.4 Comment: The Great Lakes and Mid-Atlantic Hazardous Substance Research Center (GLMAC) is proposing to establish a facility at WAFB for research of bioremediation of certain identified IRP sites. The U.S.A.F. and GLMAC should coordinate these activities with approvals from this Department. (10-2)

Response: AFBDA OL is responsible for oversight of all IRP activities at the base, including obtaining appropriate approvals from MDNR. All activities of the GLMAC would be fully coordinated with the overall conduct of the IRP.

4.0 LAND TRANSFER/DISPOSAL

4.1 Comment: We believe that the feasibility of transferring portions of the base to other entities should be assessed. As much as possible, natural areas within the base's perimeter should be opened up for public access for hunting, fishing, trapping and other outdoor recreation. Specifically, the large undeveloped northwestern portion of the base may be better managed if it is consolidated with contiguous state forest lands. Some portions of the base's southern fringe may also be better managed separately from the developed areas. And the existing small arms range should be conveyed to a local governmental unit or nonprofit organization so that it may be made available to the public. (8-3)

Response: The Proposed Action analysis evaluates use of the northwestern part of the base for public recreational uses, similar to the adjacent state forest areas, and indicates that the small arms range would be used as a public firing range. As stated in Chapter 1, only 42 percent of the land within the base boundary is Air Force fee-owned land subject to disposal. The remainder, including the large, undeveloped northwestern portion of the base, is leased or granted to the Air Force and will be returned to the owner when the Air Force's need for the land ends.

5.0 LOCAL COMMUNITY

No comments were received for this area of concern.

6.0 LAND USE/AESTHETICS

No comments were received for this area of concern.

7.0 TRANSPORTATION

No comments were received for this area of concern.

8.0 AIRSPACE

No comments were received for this area of concern.

9.0 UTILITIES

9.1 Comment: We asked for impact studies regarding reuse as it relates to water and sewer lines, heating system, etc. (5-2)

Response: Potential environmental impacts of reuse of base utility systems are addressed in Section 4.2.4 of the EIS. Adequate capacity exists in the region for all utility systems. Detailed analysis such as assessing individual facility connections is beyond the conceptual nature of the alternative reuse scenarios.

9.2 Comment: The Air Force fails to adequately address the concerns about the WAFB sewage and water supply systems. Referring to the malfunctioning sewage plant, the DEIS states on page 3-68 that "the new permit applicable (in progress) will include a request for a variance of effluent limitations." (9-8)

Response: Chapter 3 of the EIS describes existing conditions; Chapter 4 addresses potential environmental impacts. Section 4.2.4 indicates that the community will likely decide to connect base water and sewer lines to community systems, which have sufficient capacity.

9.3 Comment: Section 3.2.4.2 discusses wastewater issues. It is not clear who will be responsible for operation of the sewage lagoons after the U.S.A.F. leaves. Impacts from the current lagoons would have to be monitored to ensure contaminant levels do not exceed regulatory levels. (10-5)

Response: Refer to response to comment 9.2. The Air Force will conduct appropriate remediation actions at the sewage lagoons under the IRP. A statement has been added to Section 4.2.4, indicating that monitoring near the on-base lagoons would be required until the connection to the Oscoda plant is established.

10.0 HAZARDOUS MATERIALS/WASTE MANAGEMENT

10.1 Comment: Why isn't anyone addressing the severe contamination problem on Wurtsmith Air Force Base? (3-2)

Response: The Air Force is conducting the IRP in accordance with CERCLA. IRP activities will continue as necessary after closure. The IRP process includes review of remediation plans by cognizant regulatory agencies, as well as keeping the public informed (see Figure 3.3-1, page 3-42). Detailed discussion of the IRP is beyond the scope of this EIS.

10.2 Comment: I wanted to know the health effects of drinking contaminated water. I did not find the information I was looking for. I also wanted to see statistics on the extent of the contamination. My husband drank that water for 6 years, and I want to know the health risks. (4-1)

Response: As stated in Section 3.3, Wurtsmith AFB has been treating groundwater contamination and monitoring water quality since 1979. As contaminant levels have exceeded standards in potable wells, the Air Force has shut down the wells and made other provisions for water supply for on- and off-base residents. The monitoring program ensures that all drinking water meets applicable water quality standards. IRP documentation provides detailed information on health risks, and is available to the public via the local library and AFBDA OL. Detailed discussion of contaminant levels is beyond the scope of this EIS.

10.3 Comment: Nearly every person at the 1991 hearing requested environmental cleanup plans from the Air Force. We asked for timetable, methods, who would be employed and suggested that the

final draft respond to the priority reuses identified through the Onward Oscoda Survey. (5-1)

Response: IRP documentation includes detailed plans and schedules for remediation of contaminated sites. Concerned citizens may keep abreast of the IRP via public meetings and information contained in the Administrative Record, copies of which are available at the AFBDA OL and the local library located at 110 South State Street in Oscoda, Michigan. The Air Force responded to community desires for reuse by adopting the community's reuse plan, developed after the Onward Oscoda Survey, as the Proposed Action in this EIS.

10.4 Comment: We emphasize the need to, in addition to surveying Weapons Storage Areas (WSA) for ordnance, carefully check any historical records for the WSA and the entire base for possible underground disposal of highly explosive and chemical warfare material. (7-1)

Response: In addition to the IRP conducted at each Air Force base, as part of the closure process, the Air Force is conducting an environmental baseline survey of each closing base to identify current and historic activities that may involve contamination, in compliance with CERCLA 120(h) and other applicable disclosure requirements. The environmental baseline survey will evaluate the likelihood of the existence of and contamination from highly explosive or chemical warfare material throughout the base.

10.5 Comment: We have significant concerns about the lack of information concerning remediation plans for contamination problems remaining from base operations. While the extent of the problem is characterized, no plan or schedule for clean-up operations or discussion of how the phasing of remedial actions could affect plan implementation is presented. Given the extensive history of contamination problems at the base, this important issue should have been addressed in far more detail in the DEIS. (8-4)

Response: Refer to response to comment 10.3. Additionally, disposal of properties and reuse thereon will be closely coordinated with the IRP.

10.6 Comment: The document is inadequate in that it does not have as its central focus the environmental restoration of Wurtsmith AFB and the surrounding area and the protection of the community from any additional environmental problems that may arise from the civilian redevelopment of the WAFB facilities. (9-5)

Response: The central focus of the EIS is the proposed federal action (i.e., the disposal and reuse of the base property). The IRP is a separate process that addresses remediation of sites contaminated by Air Force activities. New users would be responsible for management of hazardous materials and wastes associated with reuse activities, and would be subject to applicable federal, state, and local regulations for the protection of human health and the environment.

10.7 Comment: The Air Force states in the DEIS that it is undertaking environmental restoration at Wurtsmith according to the standards and guidelines of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Unfortunately, CERCLA will not provide for prompt and comprehensive environmental restoration of the Wurtsmith site. Many of the contaminated sites listed by the MDNR would not be remediated by CERCLA, in particular, petroleum (jet fuel) spills. CERCLA also does not provide for indemnification for future property recipients. (9-7)

Response: The Community Environmental Response Facilitation Act (CERFA) of October 1992 eliminated the petroleum exclusion for closing bases. As indicated in Table 3.3-2, jet fuel spills are being addressed by the IRP at Wurtsmith AFB. Remediation schedule considerations are addressed under the IRP. Details of the IRP process and indemnification issues are outside the scope of this EIS.

10.8 Comment: A waiver of responsibility is given to problems with asbestos on the base -- page S-16: "Demolition or renovation of certain structures with Asbestos-containing materials would be the responsibility of new owners." (9-9)

Response: As stated in the EIS, the primary concern regarding asbestos is release into the air, which generally comes about as a result of renovations or demolition of structures with ACM. Air Force policy and EPA guidelines recommend management in place, to avoid release. Regulations require that the Air Force disclose the potential presence of asbestos in structures to new owners prior to transfer or lease. Results of the asbestos survey completed in late 1992 have been incorporated into Section 3.3.5 and Appendix H of the Final EIS.

10.9 Comment: The DEIS endorses a proposed action plan that calls for intensive development of the Wurtsmith site, including re-use of the aviation facilities, industrial development, and renovation of the base housing. The DEIS fails to detail the numerous problems that could arise from such development. On page 4-25, the DEIS states: "Under the Proposed Action hazardous wastes generated would

consist of waste oils, fuels, solvents, paints, thinners, and heavy metals." Many of these waste products are the same as those which are presently the source of the contamination problems at Wurtsmith. Why allow any activity that has the potential to contribute to already existing environmental problems?

On page 4-45, the DEIS states that: "Storm water discharge (non-point source) from the airfield, airfield support areas, and other heavy industrial areas may contain fuels, oils, and other residual contaminants which could degrade surface water resources in the Au Sable River and Van Etten Creek." Once again, why risk further environmental degradation by endorsing the same type of development - aviation related activities, in particular - that has already caused toxic contamination? (9-10)

Response: Refer to the response to comment 10.6. Additionally, most of the contamination resulting from Air Force activities occurred prior to many environmental management regulations. Therefore, the risks of future contamination from the activities described under the Proposed Action and alternatives are considered low.

10.10 Comment: Generally, the DEIS acknowledges the responsibilities of the U.S.A.F. to fulfill its obligations to leases, grants, permits, the court-ordered consent decree, and federal environmental regulations. It has, however, arbitrarily decided to meet certain State environmental regulations while ignoring others. For instance, the U.S.A.F. has agreed to follow the State of Michigan State Police Fire Marshal requirements for abandonment and reuse of UST's but has not agreed to meet Michigan's cleanup standards under MERA. (10-1)

Response: Because the base is a federal installation, the Air Force is required to comply with federal regulations addressing management of hazardous materials and wastes. In complying with federal regulations regarding USTs, the Air Force is also complying with Michigan's UST regulations, which parallel the federal regulations. This is not necessarily true for other regulated materials.

10.11 Comment: Table 2.7-2 outlines the summary of environmental impacts from the proposed action and other reuse alternatives. ERD's primary concern is what effects each of the reuses will have on soils, groundwater and remedial actions at IRP sites.

Table 2.7-2 does not indicate remedial actions at IRP sites will be affected in any way other than possible delays in disposition of some

parcels of land. If the U.S.A.F. continues to meet its obligations, this will remain true. (10-3)

Response: Chapter 4 of the DEIS addresses the potential environmental impacts of each conceptual reuse alternative on soils (Section 4.4.1), groundwater (Section 4.4.2), and remedial actions at IRP sites (Section 4.3). Where potential impacts have been identified, mitigation measures are suggested to reduce or eliminate adverse impacts. These effects and mitigations are summarized in Table 2.7-2. The Air Force must complete the IRP for the contaminated sites on Wurtsmith AFB and provide the assurances required by CERCLA § 120(h) for all properties disposed.

10.12 Comment: Section 3.3.3. It should be noted that the EPA has proposed WAFB for listing on the NPL. (10-6)

Response: Comment noted. The EPA proposed listing Wurtsmith AFB on the NPL after publication of the DEIS. The final decision regarding listing is pending as the Final EIS goes to press.

11.0 SOILS AND GEOLOGY

11.1 Comment: In regard to sand and gravel resources, the document seems to display conflicting conclusions. The presence of glacial deposits 100 to 250 feet thick containing sand and gravel is mentioned on Page 3-64. However, on Page 3-65, the statement is made "There are no sand and gravel deposits on the base", and on Page 4-44, it is stated ". . . . . no mineral or sand and gravel deposits of economic interest are known or expected to be present on Wurtsmith Air Force Base." On Pages E-6 and E-7, it is emphasized that information on availability of aggregate (sand and gravel) was obtained from literature and official sources, indicating that the subject has been studied in some detail.

Glacial deposits usually contain sand and gravel, although such material is not always useable owing to various factors. It appears in this case that sand and gravel is present, but that it is not regarded as a resource. This apparent incongruity should be explained in future versions of the environmental statement. Otherwise, we find that the document, as written, has adequately described mineral resources and the potential impacts of the proposed project upon these resources. (6-2)

Response: The text (Sections 3.4.1.2 and 4.4.1) has been revised in response to the comment to clarify the availability of sand and gravel resources on Wurtsmith AFB.

11.2 Comment: Table 2.7-2 does identify potential soil impacts resulting from activities associated with the Fire Training Alternative. Runoff from burn areas could adversely impact the environment. Any of these activities must be designed to prevent the release of contaminants to the environment. (10-4)

Response: The DEIS suggests appropriate mitigation measures to reduce or avoid impacts from reuse activities. Ultimately, mitigations for reuse would be the responsibility of the new user. The Great Lakes Fire Training Academy is aware of the permitting and coordination process required should it establish a fire training use at Wurtsmith AFB.

12.0 WATER RESOURCES

12.1 Comment: The document fails to make the required Finding of No Practicable Alternative to taking an action in the base ("100-year") floodplain. Portions of the south perimeter of the base are in the 100-year floodplain and reuse alternatives may affect this area.

Executive Order 11988, Floodplain Management, and AFR 19-9 (14 February 1986) specify USAF responsibilities for actions in the floodplain, including base disposal. The final EIS needs a separate Finding of No Practicable Alternative if there are no alternatives to taking the action in the floodplain. Also, an eight-step public review and mitigation process needs to be initiated if an action in the floodplain is undertaken. (2-1)

Response: The text has been revised to discuss floodplain management requirements (including Executive Order 11988 and Air Force Regulation 19-9) and steps associated with federal disposal of property in a floodplain. A "Finding of No Practicable Alternative" for proposals concerning the floodplains is not applicable at this point in the base disposal and reuse process because the Air Force is currently performing the NEPA-mandated process of evaluating several practicable alternatives in this EIS. The Air Force will follow procedures required by Executive Order 11988 and Air Force Regulation 19-9 (including a Finding of No Practicable Alternative, as applicable) at the appropriate point in the disposal process.

12.2 Comment: We suggest the final EIS include a copy of the Oscoda Township Flood Insurance Rate Map and a discussion of the source of the 100-year flood information shown in Figure 3.4-2. (2-2)

Response: The figure was based on the Oscoda Township Flood Insurance Rate Map. The figure has been slightly revised to show more completely the configuration of the floodplain (as detailed in the Flood Insurance Rate Map). The accompanying text has also been revised accordingly.

12.3 Comment: Table 2.7-2 does identify potential groundwater impacts resulting from activities associated with the Fire Training Alternative. Runoff from burn areas could adversely impact the environment. Any of these activities must be designed to prevent the release of contaminants to the environment. (10-4)

Response: Refer to response to comment 11.2.

12.4 Comment: Redevelopment plans should recognize that public water supply wells are nearby and residences or businesses may be within the future wellhead protection area. Proximity of proposed development and activities to these wells should be considered in land use zoning plans. The Final EIS should identify the location of these wells, and consider how impacts would be avoided within wellhead protection areas. (11-1)

Response: Locations of the Oscoda wells have been added to Figure 3.4-2. Information regarding implementation of wellhead protection area delineation in Michigan, and the status of the process at Oscoda has been added to Section 3.4.2.4. Discussion has been added to Section 4.4.2 describing the potential for wellhead impacts, considering construction of new facilities, groundwater contamination from future actions, potential abandonment of the base well field, and conversion to a new water supply system for Oscoda.

12.5 Comment: Selection of the fire training alternative could lead to groundwater contamination via improperly constructed fire training pits. Plans for fire training facilities will need to include groundwater protection measures, such as lined pits, proper storage of training chemicals, and proper disposal of wastes. If the fire training alternative is selected, then implementation of these mitigation measures should be committed to in the Final EIS. (11-2)

Response: Refer to response to comment 11.2.

13.0 AIR QUALITY

13.1 Comment: The DEIS makes the assumption that air quality would not be affected by development in the Proposed Action plan. As there is a heavy industrial component in the plan, that claim can not be substantiated. (9-11)

Response: Air quality modeling indicates that emissions from Proposed Action activities would not result in violation of federal or state air quality standards. New users will be required to comply with federal and Michigan air quality regulations, which, as stated in Section 4.4.3 of the DEIS, require that industrial sources obtain operating permits and institute pollution reduction measures if a source is determined to be a major source or to cause a significant environmental impact.

14.0 NOISE

No comments were received for this area of concern.

15.0 BIOLOGICAL RESOURCES

15.1 Comment: Based upon the information supplied in the document, we do not anticipate any impacts to wetlands or other aquatic resources that would require a permit under Section 404 of the Clean Water Act. However, the final determination of the need for a permit lies with the agencies having regulatory responsible for such activities - the Michigan Department of Natural Resources and the U.S. Army Corps of Engineers, Detroit District. (6-1)

Response: Comment noted.

16.0 CULTURAL RESOURCES

No comments were received for this area of concern. However, the Michigan SHPO has recommended further site investigations, and the consultation process as required under Section 106 of the NHPA is proceeding.

17.0 SOCIOECONOMIC IMPACT ANALYSIS STUDY

No comments were received for this area of concern.

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UNITED STATES OF AMERICA

IN RE:

UNITED STATES AIR FORCE
PUBLIC HEARING ON THE DRAFT
ENVIRONMENTAL IMPACT STATEMENT
FOR DISPOSAL AND REUSE OF
WURTSMITH AIR FORCE BASE.

P U B L I C   H E A R I N G

Oscoda Area High School
3550 East River Road, Oscoda, Michigan

Monday, April 5, 1993 - 7:00 p.m.

COLONEL JAMES E. HEUPEL, Hearing Officer,
Chief Circuit Trial Judge, Judicial Division,
United States Air Force

PANEL MEMBERS:

MR. THOMAS KEMPSTER,
Base Disposal Agency,
United States Air Force.

MR. WILLIAM MYERS,
Chief, Planning Management Division,
Center for Environmental Excellence,
United States Air Force.

ERNEST GUBRY,
Community Planner,
Federal Aviation Administration.

Deborah A. London - CSR 2364
Certified Shorthand Reporter

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(7:05 p.m.)

COLONEL HEUPEL: We're going to start in in just a minute. I encourage you to come on down. We've got plenty of seats up front, but it may be easier to see the screen, too.

I'm going to go ahead and start in. We've been holding off a little bit because I know that there are probably some more folks that are coming. I understand there may be some people out in the back right now filling out some cards and some more cars driving up, but I suspect that some of you would, not to belittle the

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importance of the meeting here, but some of you might like for us to be able to get through the meat of what you would like to see so that you can go back and turn on your television sets. Now, I'm from Indiana and, unfortunately, we're not playing with Michigan tonight. But I came to the conclusion it must have been somebody from the west coast that said, let's have this meeting tonight. They didn't realize how good Michigan was. So I do want to go ahead and keep our schedule going and the other people can come on in.

I do want to thank you for coming out tonight. This is the public hearing on the draft environmental impact statement for the disposal and reuse of Wurtsmith Air Force Base. My name is Colonel Jim Heupel and I'll be the presiding officer for tonight's hearing.

This hearing is being held in accordance with the National Environmental Policy Act and Implementing Regulations. Now, that act requires federal agencies to analyze the potential environmental impacts of certain proposed actions and alternatives and to consider the findings of those analyses in deciding how to proceed.

Now, on November 7th of 1991, a scoping meeting was held here in Oscoda to receive your suggestions concerning what you felt should be covered in our environmental impact statement we refer to as EIS or you'll hear

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it sometimes called the draft EIS. Since that meeting back in 1991, the Air Force has examined the environmental concerns that you raised and other people raised and it has prepared a draft environmental impact statement that is the subject of tonight's hearing.

Now, some of you may have received that statement in the mail. It would have been mailed to some of the public libraries in the area. If you're interested in finding out where that can be found, let me know at some point and we'll get that information to you.

The purpose of tonight's hearing is to receive your comments, suggestions and criticisms of this draft environmental impact statement. Now, those of you who have not had an opportunity to review the draft EIS itself, you may want to read the summary which I'm holding up right now. This summarizes the major findings of the EIS. It's available back at the door on the table if you didn't get one. Now, the major findings will also be addressed by panel members in their presentations.

Before introducing the members of the panel, let me explain my role in the hearing. I'm the chief trial judge for the Air Force. I serve as a military criminal trial judge as well as supervising other trial judges in the Air Force. I come from Washington, D.C., so I'm not here as an expert on this draft EIS. In fact,

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I have not had any connection with its development. I am not here to act as a legal advisor to the Air Force representatives who will address these proposals. My purpose is to ensure that we have a fair, orderly hearing and that all who wish to be heard have a fair chance to speak.

With that, let me introduce the panel members. On the far right is Mr. Ernest Gubry, a community planner with the Federal Aviation Administration from Belleville, Michigan. Now, because of potential airfield operations, the FAA is known as a cooperating agency and he's here in case there are any questions that would involve the FAA.

Now, in the middle is Mr. Tom Kempster representing the Air Force Base Disposal Agency. He will describe the Air Force base disposal process. Now, on my immediate right is Mr. William Myers who is the Chief of the Planning Management Division at the Air Force Center for Environmental Excellence which is located at Brooks Air Force Base, Texas. Now, Mr. Myers will brief you on the environmental impact analysis process and summarize the results that are reported in the draft EIS.

This meeting is intended to provide a continuing public forum for a two-way communication about the draft EIS with a view towards improving the overall decision making process.

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You'll notice that I said two way communication. Now, in the first part of the hearing [illegible] our most knowledgeable people will brief you on the details of each action and the anticipated environmental impacts. In the second part of the process you will have the opportunity to provide information and to make statements for the record. Now, this input ensures that the decision makers may benefit from your knowledge of the local area and any adverse environmental effects that you think may result from the proposed action or the alternatives. Also, if you have any questions regarding the environmental impact analysis process or the environmental impacts presented in the draft EIS or questions that come about as a result of what's briefed here tonight, you may ask the panel members and they will answer to the extent that they can. If your question is a technical one or something that requires further research and cannot be answered tonight, the Air Force will ensure that your question will be answered either in the final environmental impact statement itself or in a separate comment response section.

Tonight's hearing is designed to give you an opportunity to comment on the adequacy of the Air Force's environmental impact statement. Keep in mind that the environmental impact statement is simply intended to

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ensure that future decision makers will be fully apprised of the environmental impacts associated with the various reuse alternatives before they decide upon a course of action. However, consequently, I would say that comments tonight on issues not related to the environmental impact statement are really beyond the scope of the hearing and should not be addressed.

When you came in tonight, you were provided with a -- an attendance card. Filling out the attendance card is not mandatory although it does help give the Air Force an indication of who's present. But one of the important things is that at the bottom is a box for you to check if you'd like to come up tonight and make a statement. Now, normally the statement period is about five minutes per person to give everybody a chance to make statements. We'll talk a little bit later about other input you can put in. But if you'd like to make a statement tonight or if you'd like to ask a question if -- and you've not checked the block down here indicating that you'd like to make a statement, if you'd go ahead and raise up your hand at any time throughout the proceeding, we've got some uniformed people that will get you a card. Just fill out a new one even if you filled out one before, and check that block indicating you want to make a statement and they'll get me those cards when

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we get into that part of the hearing.

Now, after Mr. Kempster and Mr. Myers have finished their presentations, we'll have a 15-minute recess and we'll make sure we have all the cards collected. If we have any elected officials here tonight that wish to speak, I'll recognize them first and then the public at large. I'm going to just shuffle the cards and pull out cards in random order so that everybody's got an equal chance of speaking either first or last.

Now, for those of you that don't want to stand up here tonight and make an oral statement, you have until April 26th of this year to submit a copy of your statement or any comments that you want the Air Force to consider prior to its publishing the final environmental impact statement. Now, I believe -- I don't have a copy of it, but I believe that they probably have a comment form out at the table that you can fill out, put your comments on that if you like or forms out at the table that you can fill out and put your comments on that if you like, or if you want to fill it out now during the meeting, that's fine, too, or if you've got prepared comments you want to submit instead, that's fine. If you want to go home and write out comments separately, that's fine. At the bottom of that form should be the address that you need to send it to and it's the same address

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that we've got up here showing Lieutenant Colonel Gary Baumgartel's name. But it's important that you try to get back, any comments or statement you have, so that the Air Force receives it by April 26th. The Air Force will continue to accept comments after that time but it cannot guarantee that late comments will be included in the final environmental impact statement.

Okay. At this point, I would like to also indicate with regard to the oral statements and written statements, the weight is the same. So you're welcome to make an oral statement or you're welcome to make written statements or written comments or you're welcome to do both.

If when you come up here, if you have prepared statements or a prepared presentation, we'd like to encourage you to go ahead and leave that and I'd ask you just to set it up on the stage when you're done with your statement.

Again, for the people that came in late, I'd encourage you to come on down to the front. I -- I would ask all of you, since it is a school campus, please refrain from smoking in the auditorium.

Now, One thing I cannot stress enough -- you may have information about environmental influences that are unknown to us. We're very interested in hearing and

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analyzing all potential environmental impacts of the proposed action and the alternatives. You have the experience that comes from living in this area. So the second part of tonight's communication, that part that flows from you to us, is important and please do not hesitate to be a part of the proceedings. We encourage you to participate.

At this time, it's my pleasure to introduce Mr Tom Kempster who will describe the Air Force base disposal process. Mr Kempster.

MR KEMPSTER: Thank you, Colone. Heupel. My name is Tom Kempster and I work for the Air Force Base Disposal Agency, an office created to manage the cleanup and disposal of Air Force bases closed under the authorities of the base closure and realignment laws. In discussing the Air Force's proposed action for disposing of Wurtsmith Air Force Base, I'm going to cover four general topics.

First is disposal planning. Second is the disposal objective used by the Air Force to guide its planning. Third is disposal considerations we will use to arrive at a decision and last is the Air Force decision itself, that is, what actions the Air Force will take based on the findings in the EIS and other considerations.

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The Secretary of the Air Force has been delegated the authority to act as the federal disposal agent under the 1988 Base Closure and Realignment Act and the Defense Base Closure and Realignment Act of 1990 to utilize or dispose of the federal property which makes up the Air Force's closing bases. Usually this responsibility rests with the General Services Administration. Despite this change, the traditional statutes for disposal of federal property are still in effect.

The Air Force must adhere to those laws and GSA regulations that are in place at the time of the passage of the closure acts. The Air Force has also issued additional policies and procedures required to implement our delegated authority. Another provision of the 1988 and 1990 acts requires us to consult with the state governor and heads of local governments for the purpose of considering any plan for the use of such property by the local community concerned. We are meeting this consultation requirement by working with the Wurtsmith Base Conversion Authority.

Finally, our planning recognizes that the Secretary of the Air Force has full discretion in deciding how the Air Force will dispose of the property.

It is the Air Force's goal to complete closures as quickly and efficiently as possible. The Air Force

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recognizes the significant economic impact that closure will have on the local communities. The federal government and the Air Force in particular are committed to assisting communities in their efforts to replace the departing military activities with viable public and private enterprises. We are developing a comprehensive disposal plan that attempts to balance the needs of the community, the environmental consequences of our disposal decision and the needs of the Air Force.

However, Congress has provided only part of the funding for implementation of the realignments and closures. Revenues from property sales will be used to offset the funding shortfall. The Air Force also supports the use of interim leases and early transfer of property to bring jobs into the community.

The disposal of property is accomplished in a three-part planning process which includes the Air Force's environmental impact statement analyzing the various reasonable disposal and reuse alternatives for the base, the community's plan for the future use of the property and the Air Force's disposal plan which analyzes the various disposal options. The disposal plan is based on a thorough real estate analysis of the base and region, results from the EIS, interest shown by other federal agencies and inputs from the community reuse organizati

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It should be noted that federal agencies generally work with the community to solicit support for their proposal to acquire property. However, it has been the Air Force's experience that such uses for a portion of the property and facilities can be accommodated within the community's overall planned future uses for the entire base.

In general, the disposal options are transfer to another federal agency, public benefit conveyance to states and eligible non-profit institutions, negotiated sales to public agencies and competitive sales to the general public. The laws and regulations governing disposal do not establish a rigid priority for disposal but provide the federal disposal agent with the ability to ensure that all federal real property interests are disposed of in an efficient and effective manner. The Secretary of the Air Force will decide on the actual disposal plan.

Under current law, other federal agencies and homeless assistance providers must be given priority consideration in the use and acquisition of excess base real property. It is the Air Force policy to inform the local community representatives of any expressed interest from federal agencies or of homeless assistance providers. We encourage all parties to communicate openly

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with one another during the disposal planning process.

The disposal decision process culminates with the issuance of a record of decision which documents the decisions for the disposal of the real property and specifies what environmental mitigation may be needed to protect human health and the environment as a result of the disposal and reuse decision selected.

The last subject I'd like to address is that of environmental cleanup. The Air Force is committed to cleaning up all areas contaminated by past Air Force activities and to protecting the health and safety of the public and any future owners of Wurtsmith Air Force Base. Cleanup activities are continuing and additional studies are under way that will fully characterize contamination of all of the sites to determine the best means to clean them up.

It should be clear that if contaminated areas are not ready for disposal at the time of closure, the Air Force will retain ownership until the property is cleaned up. On other properties, we may require easements or rights of entry to permit long-term groundwater monitoring and treatment. Nevertheless, despite the Air Force's commitments to cleaning up all past contaminated areas and protecting the public, we do not expect any cleanup activities to delay the reuse of uncontaminated

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property at Wurtsmith Air Force Base.

Thank you for the opportunity to meet with you this evening. Now, I'd like to turn the meeting back to Colonel Heupel.

COLONEL HEUPEL: Thank you, Mr. Kempster. Now, I'll present Mr. William Myers from the Air Force Center for Environmental Excellence who will brief us on the environmental process. Mr. Myers.

MR. MYERS: Thank you, Colonel Heupel. Good evening, ladies and gentlemen. My name is Bill Myers and I'm the Planning Coordinator at the Air Force Center for Environmental Excellence and that's at Brooks Air Force Base in Texas.

Our organization is conducting the environmental impact analysis process for the disposal and reuse of Wurtsmith Air Force Base and the other major installations around the country that are mandated to close during Round II of the Base Closure and Realignment Act.

Tonight I will present the schedule for this environmental impact analysis process and show how the public comment period fits into this schedule. I'll also discuss the scope of the study and the relationship between the environmental impact statement and the socio-economic study and I will present the results of our analysis by resource category.

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This environmental effort was begun October 9 of 1991 with a notice of intent to prepare an environmental impact statement, or what I'll refer to and Col. Heupel referred to as an EIS, for base disposal and reuse.

A scoping meeting was held here on November 7 1991 to receive public input on the scope of the issues to be addressed in the EIS and to identify reuse alternatives and issues relating to property disposal. During the scoping process, our office received input from the public and a reuse proposal from the Wurtsmith Base Conversion Authority. The Wurtsmith Base Conversion Authority proposal includes a civilian aviation component.

Because of the potential for an aviation reuse of the base, the Federal Aviation Administration, Midwest Region, was invited and agreed to become a cooperating agency in the preparation of the EIS. The Air Force is working with the FAA to include their expertise in environmental requirements in this EIS. After scoping, we collected the necessary data and conducted the environmental analysis. The draft EIS was filed with the U.S. Environmental Protection Agency on March 12, 1993.

In addition to tonight's hearing, written comments on the draft EIS will continue to be accepted at

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this address until April the 26th of this year. After the comment period is over, we will evaluate all comments, both written and verbal, and perform additional analysis or change the EIS where necessary. Again, as in the scoping process, equal consideration will be given to all comments, whether they are presented here tonight or mailed prior to April 26th.

Once the review process is complete, we will produce a final EIS scheduled for completion in July of '93 and we will mail it to all those on the original draft EIS distribution list. If you are not on our mailing list, you can request a copy by writing to this address. The final EIS will include comments received during the public review period and our response to those comments.

If appropriate, we will group comments into categories and respond accordingly. Depending on the number and diversity of comments or the need to conduct additional analyses, the final EIS may consist of a separate volume as a companion to the draft EIS or be distributed as a cover letter and errata sheets. The documents will serve as input for the record of decision which will document the decision by the Air Force. As you just heard from Mr. Kempster, other studies and considerations of issues besides those addressed in the EIS

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will enter into the final disposal decision. We hope to accomplish the record of decision in late September this year.

The draft EIS was prepared to comply with the National Environmental Policy Act and the Council on Environmental Quality Regulations. Efforts were made to reduce needless bulk, write in plain language, focus only on those issues that are clearly related to the environment and to integrate with other documents required as part of the decision making process. Reuse alternatives that were developed during the scoping process were individually analyzed to provide an environmental comparison.

This analysis focuses on impacts to the natural environment that may occur as a direct result of base disposal and reuse or indirectly through changes in the community. Resources evaluated are soils and geology, water both surface and groundwater, air quality, noise, biological resources and cultural resources. Indirect changes to the community that provide measures against which environmental impacts could be analyzed include changes to the local population, land use and aesthetics, transportation and community utility services. In addition, issues related to current and future use, storage and management of hazardous materials are discussed in

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the document. These issues include hazardous materials and wastes, the Air Force's Installation Restoration Program, storage tanks, asbestos, pesticides, polychlorinated biphenyls or PCB's, radon, medical or biohazardous waste management and ordnance.

If, as a result of our analysis, it was determined that adverse environmental impacts would occur through implementation of a reuse alternative, potential mitigation measures were identified and included in this document.

As I mentioned earlier, this draft EIS focuses on the impacts to the natural environment that would occur either directly or indirectly from the disposal and reuse of Wurtsmith. The document addresses socioeconomic factors where there is a relationship between base disposal and changes to socioeconomic conditions that would result in impacts to the natural environment. Our organization has recently produced a separate socioeconomic study that is not required under the National Environmental Policy Act. It describes in detail how disposal and reuse of Wurtsmith may affect the economies of the surrounding areas.

Specifically, the socioeconomic study addresses the following factors for each of the reuse alternatives. Population, employment, housing, public finance, education, government, police and fire, medical, transportation and utilities. Copies of this document were recently provided to key federal, state and local officials and are available for review at libraries in the area. The document will be forwarded to the decision maker for input into this disposal process.

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Now, I'll present an overview of the proposed action and alternatives that have been analyzed. Afterwards I will present a synopsis of the results of our analysis by resource category.

Please note that the title of each alternative is presented to give the reader only a general idea of the redevelopment concepts. Each of the alternatives contains numerous plans and activities which may not be included in the title.

The Air Force owns only about 12 percent of the land within the Wurtsmith Air Force Base boundary and it is in this area that it is available for disposal, disposal by the Air Force BDA. The remainder of the base property has been leased, permitted, or granted to the Air Force for a limited duration. However, because the Air Force decision on whether and how to dispose of its property may influence how the other portions of the base property will be reused, the EIS analyzes the environmental effects of the overall reuse of all of the base

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property. This figure shows the land uses for the proposed action. The focus of the proposed action is the reuse of existing aviation related infrastructure to establish a civilian aviation facility. The airfield and adjacent aviation support areas would be used for maintenance and refurbishing and general aviation operations. Civilian redevelopment of non-aviation portions of the base would include industrial, educational, commercial and residential uses as well as the retention of the existing hospital for use as a medical clinic. The large forested area in the northwestern portion of the base would remain undeveloped for future public recreation and conservation uses.

Aviation related land use areas are shown in brown and blue. Industrial and office/industrial park areas are depicted in gray. The medical areas are shown in purple, educational areas in pink, commercial in red, residential in yellow and recreation and open space areas in green.

This map shows land uses for the fire training alternative. This alternative includes the development of a regional fire training academy in the airfield, weapons storage area and alert area. Although the academy boundary encompasses the forested lands in the northwestern part of the base, most of that area would be

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used as a buffer between the fire training activities and other uses. Less industrial and commercial development is proposed under this alternative than in the proposed action. Some educational development is proposed in the cantonment area and most of the family housing would be retained for residential uses. As in the proposed action, the base hospital would be retained for use as a medical clinic. Again, educational use areas are shown in pink, industrial in gray, commercial in red, residential in yellow, medical in purple and recreational and open areas in green.

This map show the land uses for the recreation alternative. Under this plan, most of the base would be converted for recreational activities, open space and conservation uses. Over half of the structures in base would be demolished to accommodate these uses. Small amounts of industrial, commercial, educational and residential development are also proposed. As in the other alternatives, the base hospital would be reused as a medical clinic.

Recreational, residential, medical, educational, commercial and industrial uses are shown in green, yellow, purple, pink, red and gray respectively as were the other maps.

As required by the National Environmental Poli-

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cy Act, the no-action alternative was evaluated. Under the no-action alternative, the base conditions at the time of closure would remain unchanged in the long term. Base property would remain under caretaker status with no civilian reuse. Caretaker activities would consist of resource protection, grounds maintenance, existing utilities operations as necessary and building care.

Along with the four principal alternatives I have just described, one other land use concept has been proposed which has not been captured within any of the reuse alternatives but it could be initiated on an individual basis. You may think of this concept as an overlay that can be used with any of the alternatives. This concept is the proposal of the Great Lakes and Mid-Atlantic Hazardous Substance Research Center to establish an advanced environmental technology facility at the base. This would be a national facility for research and development of technologies for decontamination and bioremediation of hazardous wastes, spills and disposal sites. The area shown in color on the figure indicates the buildings requested for the facility, specifically the bioenvironmental engineering laboratory and the vehicle maintenance facility at the base.

I will now discuss the results of our analyses that are presented in the draft EIS. The proposed action

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and all alternatives were analyzed to the same level of detail. The baseline used was Wurtsmith AFB at closure. The following slides show the comparative impacts among the reuse alternatives.

The EIS analyzed impacts to resources shown on the slide broadly grouped into the categories of local community, hazardous materials and hazardous waste management and the natural environment.

In several of these resource areas, the analysis indicated that there would be no or few impacts. These resources are highlighted on this slide and I will briefly summarize the results of our analysis.

Although there would be changes to land uses and the visual character of the base, these would be minor and could be controlled through use of standard land use planning techniques to guide development. Utility demand under reuse would increase from closure conditions but would be within the capacity of the regional systems. Reuse of the on-base wastewater treatment system would require upgrades, but the on-base system could be connected to the nearby Oscoda plant which has sufficient capacity.

Hazardous materials and waste management activities would be the responsibility of the new users and would be subject to applicable regulations. Storage

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tanks not planned for reuse would be removed. Asbestos in structures would be removed if it poses a health threat. Otherwise, it will be managed in place in accordance with federal regulations and guidelines. Pesticide usage under reuse would be subject to federal and state regulations. All polychlorinated biphenyls have been removed from the base and measured radon levels are below the EPA recommended action levels. Small amounts of medical and biohazardous waste would be generated by the clinic and would be managed in accordance with state regulations.

Relatively little surface disturbance is planned for redevelopment activities and the base area is quite flat, so erosion effects on soils would be minor. The Air Force and the Michigan State historic preservation officer have determined that there are no historic properties on base so there would be no impacts to cultural resources.

Environmental analysis has indicated the potential for impacts to the remaining resources and I will speak about each of these in more detail.

This graph shows the potential or possible increase in employment in the Oscoda region due solely to reuse related activities projected through the year 2013. These increases include the direct jobs generated on-site

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and the secondary jobs created in Iosco, Alcona, Alpena and Arenac counties. Positive economic benefits would result from the increased regional earnings, income and spending compared to closure baseline conditions.

Depending on the alternative implemented, reuse activities at the base could result in an additional 1,845 to 6867 direct and secondary jobs in the region by 2013. This increase translates to an increased growth in the local job market of about 0.6 to 1.2 percent annually between closure and 2013.

Population increases are expected under the reuse alternatives as workers and their families move into the region to fill some of the jobs created by reuse. Depending on the alternative selected, 1,845 to 8352 people would enter the region by 2013. This represents an average increase in the region's projected population growth of 0.5 to 0.8 percent annually from closure to 2013.

The redevelopment of Wurtsmith will affect local and regional transportation networks. Reuse of the base will increase traffic on local roads near the base, particularly U.S. Highway 23.

The chart shows the estimated number of average daily trips projected to be generated by each of the reuse alternatives. The number of daily trips to and

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from the site due to reuse would range from approximately 21,000 under the recreation alternative to 29,600 under the proposed action by 2013.

It should be noted here that the EIS traffic analysis was based on average traffic volumes in July, the peak traffic month because of increased tourism. Most roadways would generally maintain acceptable levels of service under each reuse alternative. However, segments of U.S. 23 through Oscoda and AuSable experienced July peak hour traffic volumes that exceeded the road's capacity before closure. Traffic volumes would decrease at closure, but under all alternatives, there would be a return to preclosure traffic conditions.

The redevelopment plans would incorporate appropriate transportation planning measures to accommodate the reuse activities and provide acceptable levels of service within the on-base road network and from the access points to the local network.

This chart shows the number of annual air operations projected through 2013 under the proposed action. For reference, approximately 62,500 flight operations consisting primarily of B-52's, KC-135's and transient aircraft occurred at Wurtsmith in 1990. At closure, flight activities would be reduced to zero. As a matter of fact, we've been told they've already been reduced to

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zero. By 2013, the number of annual flight operations would increase to about 22,600 under the proposed action.

The proposed action would include civilian use of commercial and general aviation aircraft. No adverse impacts to the region's airspace are anticipated under any of the reuse alternatives.

Surface water and surface drainage could also be affected by reuse activities. Construction of new facilities and infrastructure may change the existing flow of surface water runoff. Reuse activities are expected to comply with applicable federal and state regulations to reduce the potential to affect the quality of ground and surface waters. Installation Restoration Program activities will continue as needed to assure that groundwater contamination is cleaned up.

Air pollutant emissions resulting from or related to reuse of the base would include carbon monoxide, nitrogen oxides, sulfur dioxide, particulate matter less than 10 microns in diameter, also referred to as PM-10, and ozone which is formed by the reaction of nitrogen dioxides and reactive organic gases. Air quality in the airshed surrounding Wurtsmith is assumed by the Environmental Protection Agency and the Michigan Department of Natural Resources to be in attainment of all national and Michigan ambient air quality standards

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Reuse related pollutant emissions would increase over closure conditions but would generally remain below preclosure emission levels for all criteria pollutants. PM-10 emissions as a result of the forest fire training activities under the fire training alternative could exceed the 24 hour standards for that criteria pollutant. However, these training exercises would be conducted only once or twice each year under conditions conducive to dispersal of emissions and the impacts would be localized and short term. Overall impacts on regional air quality would be minimal.

A commonly accepted measure of noise is DNL, the day-night average sound level. DNL is expressed in decibels, or DB, with a penalty added for increased annoyance from noise during the night. 65 decibels is equivalent to normal speech at three feet and is the accepted threshold for restrictions on land uses.

In 1990, Wurtsmith flight operations exposed an area of approximately 37,500 acres to DNL 65 or greater. An estimated 9800 persons lived in this area. Under the proposed action, 65 DB contours from civilian aircraft operations would encompass a maximum of 301 acres in 1998. After the year 2000, this acreage would decrease as quieter aircraft are introduced under FAA regulations. Because the 65 DB contours would be entirely contained

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within the airport boundary, no residents would be exposed to excessive noise levels.

Noise from surface traffic along U.S. 23 in Oscoda and AuSable would increase from closure conditions with reuse. Traffic increases under the proposed action would result in an increase of 156 people exposed to average surface traffic noise levels of 65 DB or greater by 2013. Effects under the other alternatives would be smaller.

There is a potential for impacts to the wetlands in the northwestern portion of the base as a result of runoff from forest fire training burn areas. However, with implementation of appropriate mitigation measures, these effects can be minimized. Overall effects of controlled burning on forest habitat can be beneficial, enhancing the diversity of the ecological community. Reuse activities for the other alternatives would not present impacts to wetlands or other biological resources.

The Air Force is conducting investigations to identify, characterize and remediate environmental contamination on Wurtsmith Air Force Base that has resulted from past actions. This comprehensive effort is called the Installation Restoration Program, or IRP.

The IRP includes procedures for identifying

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sites of contamination, determining appropriate remediation techniques and remediating and monitoring as necessary to ensure that the site is clean. The proposed plan for cleanup of a site is distributed to relevant regulatory agencies for review and comment. A schedule is prepared for each part of the process at each site. Congress has committed funding for the IRP and the process is in progress at Wurtsmith. The Air Force makes information about the IRP available to the public through published information available at public libraries as well as through sources such as the base public affairs office, the base disposal agency operating location and public meetings and notices.

Cleanup activities will be accomplished in accordance with applicable federal and state laws and regulations. Remedial actions and monitoring will continue after base closure and long term access to certain sites may be required to ensure the success of the remediation efforts.

The Air Force will take all necessary actions for environmental cleanup of the base to protect public health and the environment. Deeds of property transfer will contain this assurance and all property transfers will be conducted in compliance with the Comprehensive Environmental Response, Compensation and Liability Act,

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otherwise known as CERCLA.

The explosive ordnance, grenade and small arms ranges will be cleared of unexploded ordnance and spent ammunition before base closure.

In order to comply with federal disclosure laws regarding disposal of property, the Air Force is conducting an environmental baseline survey at Wurtsmith Air Force Base. This effort will identify all areas of the base that may contain constraints to transfer of property. Types of constraints include contaminated sites that require remediation, presence of hazardous materials such as asbestos that must be properly managed to minimize health threats, and resources that are subject to federal or state protection, such as wetlands and historic properties. The environmental baseline survey results and report will be completed prior to disposal of any parcel on Wurtsmith.

In closing, I remind you that this study is in a draft stage. Our goal is to provide Air Force decision makers with accurate information on the environmental consequences of this proposal. To do this, we are soliciting your comments on the draft EIS. This information will support informed Air Force decision making. I'd now like to turn the meeting back over to Colonel Heupel.

COLONEL HEUPEL: Thank you, Mr. Myers. We'll

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take a recess now until five minutes after 8:00. At that point, we'll go into the public comment period. As I indicated to you earlier, the time period normally allotted is five minutes. Now, if there are some people that would like to -- feel they need more than five minutes, I'll give those people an opportunity to come back up after everybody else has had an opportunity to make their comments.

Again, I'd remind you that there's no smoking, it's our understanding, not only in the auditorium but in the building. So if you're a smoker, during the recess, just step outside if you would, please. We'll come back at five after 8:00. Thank you.

(Recess from 7:54 to 8:05 p.m.)

COLONEL HEUPEL: At this time, we'll go ahead and move into the public comment period. I should point out that the panel members are not the decision makers regarding the proposed action or the alternatives.

If, during the public comment period, a speaker requires any clarification or information prior to providing comment, the panel members will try to answer questions to ensure everyone has an opportunity. Well, I'm not even going to go into that. I'll tell you now, I've got only one card.

I do want to encourage you, if you have any

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comments with regard to what's in the draft EIS or what's been briefed tonight, don't be shy or hesitant about making a statement. I'm going to give you some time in a moment; even though I've only gotten one person that's filled out a card, somebody else may have decided that they're willing to speak if they don't have to fill out a card. I'm going to give you your shot at that, too, because we're very serious when we say that we are interested in getting comment from the public. You do know the local area and there may be some things that the Air Force is unaware of. So we certainly do want your comment.

When we -- when you come down, I'm going ask that you come down to the podium down in front. If -- once I've recognized you, please indicate your name and what city you're from and go ahead and start in. I'm going to be very liberal in my five-minute rule. I'm going to basically kind of set aside my five-minute rule because that's not a -- that's not a problem at this point. But I do want to encourage some of the rest of you, after our known speaker speaks, if you have something that you'd like to say, I do want to give you an opportunity to speak because your views are important to us.

At this time, I'm going to ask Mr. Dean Wiltse

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to speak. Mr. Wiltse, and if you'd please address your comments to me.

MR. WILTSE: Okay. Thank you. My name is Dean Wiltse and I am the Supervisor of Oscoda Township as well as operator of a local business. Previous to my current position, I was president of the Oscoda-AuSable Chamber of Commerce and an active member and supporter of the Military Affairs Committee.

As the chief elected officer of Oscoda Township, I am a member of the Wurtsmith Base Conversion Authority, the agency created by the State of Michigan to oversee the conversion of the base by the governor and the legislature of the State of Michigan.

I have reviewed the environmental impact statement and basically agree with its conclusions, that is, as I read it, the acceptance of the reuse master plan designed by Oscoda Township's and the WAEAC commission offers the best hope of our area recovering from the economic catastrophe known as the closure of the Wurtsmith Air Force Base.

However, what the EIS leaves to question and open to really just hope is the issue of how involved the Air Force will be in supporting the Oscoda community's reuse strategy. That is, the projection offered by this document by the Air Force will be empty unless we see a

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greater effort on the part of the Air Force to become active partners in the reuse effort.

It is ironic that earlier today I participated in a special meeting of the conversion authority to approve the interim lease between the Air Force and the base conversion authority so that our first reuser, Oscoda Plastics, can start operations.

The irony is that it took six months to the day to reach this point and then only after Oscoda Plastics threatened to walk away. At this point, I want to note that when I refer to the Air Force in these statements, I am principally speaking of the Washington Air Force policy makers, not those representatives here in Oscoda.

The cooperation we have received from the Wurtsmith assigned personnel has been excellent. On the other hand, the response from the Washington Air Force hasn't nearly matched local efforts. In fact, if the pace of support continues as we've seen it in the past, the jobs you've mentioned being created by 1998, which I believe are just under 5,000, cannot possibly occur until at least the year 2003.

Perhaps the EIS should be looked at in the light of the other Air Force Washington promises. I don't doubt that many will be fulfilled but I wonder if we can stand to wait until then. I think it is time for

Document 1

the Air Force to reexamine a process that is clearly failing to keep the repeated promises of Air Force senior officials in Washington.

To the Congress, to the base closure commission, and to the communities involved, the Air Force has offered assurances that they will help communities convert bases to civilian use. If Wurtsmith is an example, the Air Force is not so much committed to converting bases but to closing them on a schedule they unilaterally arranged.

The Air Force is also committed to keeping as much of the equipment in its own inventory. Though our community representatives have followed the process outlined by the Air Force, we have had to fight tooth and nail for every single piece of equipment we've identified for legitimate reuse. Rather than helping our community convert the base by offering personal property that could be adapted to successful reuse, we have been forced to fight item by item to keep equipment we see as essential either to attract reusers or to operate the base after the Air Force lowers the flag.

The special land ownership at Wurtsmith has given us the ability to offer the Air Force an opportunity. Our offer is transfer the land to us and we will waive our right to require the Air Force to remove all

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the structures on the base. Our consultant has estimated that this restoration clause in the state lease of land to the Air Force for Wurtsmith would cost the Air Force 17.8 million dollars.

I hope these comments will be seen as I have intended them. The Air Force and the communities whose lives they are impacting need to be partners in the reuse of these bases. It is sad testimony that I don't believe we are there today.

The base closure process must be changed if the policy makers in Washington are really serious about converting former military bases into viable economic opportunities for the communities that have supported them throughout their existence. Thank you.

COLONEL HEUPEL: Thank you. Supervisor Wiltse I have no more cards but we can still take volunteers Is there anybody else that has any comment that they would like to make tonight? If so, raise up your hand and I'll recognize you. Come on up, sir. If you would please state your name and where you're from.

MR. STALKER: Sure. My name is Bob Stalker and I'm the Oscoda Township Superintendent and I would like to follow up on Mr. Wiltse's comments. Although I've been deeply involved in the conversion process at Wurtsmith, and I think from my perspective there's an

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inherent conflict in the two primary goals of trying to convert military facilities which are closing and at the same time realize as much economic benefit as possible for the Department of Defense, and I think from a policy standpoint, that the Department of Defense needs to take a serious look at that.

There are two significant priorities there that have to be examined. It's difficult, I understand, to pursue both those goals at the same time. The people that have to implement that policy and the folks on the front line in those efforts have to deal with that and I would encourage you to evaluate that situation.

I think a clear example of that is the lease which Mr. Wiltse made reference to. The community as well as the Department of Defense representatives have worked long and hard to get to the point where we're ready to execute a lease and at the last minute, there is controversy over who's going to receive the proceeds from the lease payment itself, and it seems to me that that's a situation which should have been resolved long before this and is indicative of the type of policy conflict that's inherent in the process. Thank you.

COLONEL HEUPEL: Thank you for your comments. Are there any other comments?

(No response.)

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COLONEL HEUPEL: Nobody else?

(No response.)

COLONEL HEUPEL: Well, I want to thank you very much for coming. I do want to thank the -- the two gentlemen that spoke for their comments and their involvement. We appreciate your coming out tonight. The weather was a little -- a little snowy for me, where I'm not used to all the snow, but I think -- I suspect for you it's really beginning to look a lot like spring. But I know that many of you probably want to go and take a look at your television sets, so I'm going to declare this meeting adjourned. Thank you very much.

(Hearing adjourned at 8:14 p.m.)

- - -

STATE OF MICHIGAN)
)
COUNTY OF IOSCO)

I, Deborah A. London, CSR-2364, Certified Shorthand Reporter, do hereby certify that the foregoing transcript, consisting of 40 typewritten pages, constitutes a true, accurate, and complete transcript of the proceedings had at the

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Document 1

Public Hearing held in the aforementioned cause at Oscoda, Michigan, on Monday, April 5, 1993.

Deborah A. London - CSR 2366
Certified Shorthand Reporter
106 Thunder Bay Center, Suite 340
Alpena, MI 49707-4535
(517) 356-9620

Dated: April 12, 1993.

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Document 2

Federal Emergency Management Agency
Region V
175 West Jackson Blvd, 4th Floor
Chicago, IL 60604

March 15, 1993

Lt. Col. Gary Baumgartel
AFCEE/ESE
8106 Chennault Road
Brooks Air Force Base, Texas 78235-5318

Dear Col. Baumgartel:

This responds to the *Draft Environmental Impact Statement, Disposal and Reuse of Wurtsmith Air Force Base, Michigan, March 1993.*

1 The DEIS mentions designated floodplains for the Au Sable River and how they may be impacted by the reuse alternatives, but the document fails to make the required Finding of No Practicable Alternative to taking an action in the base ("100-year") floodplain. Portions of the south perimeter of the base are in the *100-year floodplain* and reuse alternatives may affect this area.

12.1 Executive Order 11988, Floodplain Management, and AFR 19-9 (14 February 1986) specify USAF responsibilities for actions in the floodplain, including base disposal. The final EIS needs a separate Finding of No Practicable Alternative if there are no alternatives to taking the action in the floodplain. Also, an eight-step public review and mitigation process needs to be initiated if an action in the floodplain is undertaken. See especially paragraphs 5-6(g) and 5-7 of AFR 19-9 for this requirement and the necessary certification.

2 12.2 We suggest the final EIS include a copy of the Oscoda Township Flood Insurance Rate Map and a discussion of the source of the 100-year flood information shown in Figure 3.4-2.

3 1.1 Finally, the DEIS only contains three coordination letters. National Environmental Policy Act environmental assessment procedures require more extensive coordination with federal, state, and local agencies and interest groups than is evident in Appendix L. Please note this agency's name. It is erroneously shown as "Federal Emergency Management *Administration*" in Appendix C.

If you have any questions on floodplain management, please call David Schein, Senior Program Specialist, on FTS 363-5539 or commercial 312-408-5539.

Sincerely,

Janet M. Odeshoo
Chief, Natural & Technological Hazards Division

Document 3

April 1, 1993

TO: Lt. Col. Gary P. Baumgartel
Chief Environmental Planning Division
AFCEE/ESE, 8106 Chennault Road
Brooks AFB, Texas 78235

FROM: Maryie Matts
2998 S. U.S. 23
Greenbush, MI 48738

Dear Mr. Baumgartel

1 1.2 Any money the Air Force receives from lease agreements should go towards environmental clean-up.

2 10.1 Why isn't anyone addressing the severe contamination problem on Wurtsmith Air Force Base? In case no one has noticed; Wurtsmith Air Force Base is one of the HIGHEST RANKING SITES OF ENVIRONMENTAL CONTAMINATION IN MICHIGAN.

I only hope this blatant avoidance won't come back to haunt those who ignore this severe problem.

Please, in all good conscience, make the right decisions regarding the people in Michigan. Don't sell out.

Yours truly,

Maryie Matts

Maryie Matts

cc: Donald W. Riegle, Jr., James Barcia, Carl Levin, President Clinton, Vice-President Gore, Lt. Col. Gary P. Baumgartel.

received
APR 1993

Document 4

Written Comment Sheet

Disposal and Reuse
Draft Environmental Impact Statement
Wurtsmith AFB, MI

Thank you for attending this public hearing. Our purpose for hosting this meeting is to give you an opportunity to comment on issues analyzed in the Wurtsmith AFB Disposal and Reuse Draft Environmental Impact Statement. Please use this sheet to comment on any environmental issues that you feel should be clarified in the Final Environmental Impact Statement.

Date: April 6, 1993

1 I have gone over the E.I.S. at our local library and I was concerned. I wanted to know health effects of drinking contaminated water. I did not find the information I was looking for. I also wanted to see statistics on the extent of the contamination. My husband drank that water for 6 years & I want to know the health risks.

10.2 Also: I support "NO ACTION" - until the contamination is cleaned up.

Thank-you.

Name Maryie Matts

Address 2998 S US 23 Greenbush MI 48738
Street Address City / State / Zip Code

Please hand this form in or mail to:
AFCEE/ESE
Attn: Lt Col Gary Baumgartel
8106 Chennault Road
Brooks Air Force Base, TX 78235-5318

received
APR 1993

Document 5

April 20, 1993

To: Gary P. Baumgartel,

On November 7, 1991 the Environmental Impact Statement hearing was held in Oscoda regarding input from citizens on Wurtsmith Air Force Base closure. The draft was forwarded to the Oscoda library in March in preparation for an April 5, 1993 meeting.

My comments here refer to the contents of the draft statement. I find no evidence of analysis and truth-telling regarding the extensive contamination at Wurtsmith. As I review my statements of Nov. 7 in the form of petition, questions and comments, I can find no response to this input. Nearly every

1
10.3 person at the 1991 hearing requested environmental clean-up plans from the Air Force. We asked for time table, methods, who would be employed and suggested that the final draft respond to the priority issues identified through the Inward Oscoda Survey. We asked for impact

2
9.1 studies regarding sewer as it relates to water and sewer lines, heating system etc. There

3
3.1 is little information regarding federal govt.

Document 5

3
3.1 plans regarding housing and other federal properties.

Will you be answering impact questions and questions regarding environment in the next document? Will you answer my questions?

Please send me the finalized documents.

Sincerely,

Ardeth Platte, OP
PO Box 639
Gwinn, Mi. 49841

Document 6

United States Department of the Interior

OFFICE OF THE SECRETARY
OFFICE OF ENVIRONMENTAL AFFAIRS
230 S. DEARBORN, SUITE 3422
CHICAGO, ILLINOIS 60604

ER-93/242

April 21, 1993

Lt. Colonel Gary Baumgartel
AFCEE/ESE
8106 Chennault Road
Brooks AFB, Texas 78235-5318

Dear Colonel Baumgartel:

The Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement for Disposal and Reuse of Wurtsmith Air Force Base, Iosco County, Michigan. We offer the following comments for your consideration.

1
15.1 The subject document for the proposed project adequately addresses the concerns of the Department relative to recreational resources, and fish and wildlife resources. Based upon the information supplied in the document, we do not anticipate any impacts to wetlands or other aquatic resources that would require a permit under Section 404 of the Clean Water Act. However, the final determination of the need for a permit lies with the agencies having regulatory responsible for such activities - the Michigan Department of Natural Resources and the U.S. Army Corps of Engineers, Detroit District. Specific comments concerning mineral resources are provided below.

Mineral Resources

2
11.1 Personnel of the U.S. Bureau of Mines reviewed the subject document for possible impacts to mineral resources and/or mineral-production facilities. In regard to sand and gravel resources, the document seems to display conflicting conclusions. The presence of glacial deposits 100 to 250 feet thick containing sand and gravel is mentioned on Page 3-64. However, on Page 3-65, the statement is made "There are no sand and gravel deposits on the base.", and on Page 4-44, it is stated "......no mineral or sand and gravel deposits of economic interest are known or expected to be present on Wurtsmith Air Force Base." On Pages E-6 and E-7, it is emphasized that information on availability of aggregate (sand and gravel) was obtained from literature and official sources, indicating that the subject has been studied in some detail.

Glacial deposits usually contain sand and gravel, although such material is not always useable owing to various factors. It appears in this case that sand and gravel is present, but that it is not regarded as a resource. This apparent incongruity should be explained in future versions of the environmental statement. Otherwise, we find that the document, as written, has adequately described mineral resources and the potential impacts of the proposed project upon these resources.

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[illegible]

Document 6

Lt. Colonel Gary Baumgartel 2

We appreciate the opportunity to review the subject document and provide these comments.

Sincerely,

Sheila Minor Huff
Regional Environmental Officer

Document 7

DEPARTMENT OF HEALTH & HUMAN SERVICES — Public Health Service

Centers for Disease Control
Atlanta GA 30333
April 23, 1993

Lt. Col. Gary Baumgartel
AFCEE/ESE
8106 Chennault Road
Brooks AFB, Texas 78235-5849

Dear Lt. Col. Baumgartel:

We have completed our review of the Draft Environmental Impact Statement (DEIS) for the Disposal and Reuse of Wurtsmith Air Force Base (AFB). Michigan We are responding on behalf of the U.S. Public Health Service.

We have reviewed the Draft EIS for potential adverse impacts on human health. The Draft is well written, and we were pleased to note that the Michigan Department of Public Health was consulted during the course of preparing this DEIS.

We note that the U.S. Air Force is committed to the remediation of all contamination at this base due to past activities. We also note that based on the Installation Restoration Program (IRP) investigations, the Air Force may, where appropriate, place limits on land reuse, and it is assumed that the Air Force will continue to have limited control of property in order to complete remediation activities. Such efforts should ensure the continued protection of public health and safety.

We concur with the preferred alternative, which is based on the community's reuse plan, and we believe that most of our concerns have been adequately addressed in the DEIS. However, we emphasize the need to, in addition to 1 surveying Weapons Storage Areas (WSA) for ordnance, to carefully check any 10.4 historical records for the WSA and the entire base for possible underground disposal of highly explosive and chemical warfare materiel. Our concern for such assurances arise from our awareness of disposed lethal weapons or identification sets being discovered at other military installations.

Thank you for the opportunity to review and comment on this document. Please ensure that we are included on your mailing list to receive a copy of the Final EIS, and future EIS's which may indicate potential public health impact and are developed under the National Environmental Policy Act (NEPA).

Sincerely yours,

Kenneth W. Holt

Kenneth W. Holt, M.S.E.H.
Special Programs Group (F29)
National Center for Environmental
Health and Injury Control

received
11 APR 1993

Document 8

MUCC
MICHIGAN UNITED CONSERVATION CLUBS
2101 Wood St. ● P.O. Box 30235 ● Lansing, MI 48909 ● 517 371 1041

April 23, 1993

Lt. Col. Gary Baumgartel
AFCEE/ESE
8106 Chennault Road
Brooks AFB, Texas 78235-5318

Re: Draft EIS; Disposal and Reuse of Wurtsmith AFB

Dear Col. Baumgartel:

On behalf of the Michigan United Conservation Clubs, I would like to make the following comments on the above-referenced document.

In general, we are supportive of alternatives which will maximize the reuse of existing developed facilities at the base and the retention of remaining natural features and habitats. Among the alternatives subjected to detailed analysis, your preferred alternative appears to be the most 1 satisfactory in this respect. However, objective comparison of alternatives 3.2 is difficult due to the fact that information concerning the implementation costs and level of benefit for each alternative is lacking. The basis for selecting the preferred alternative should be firmly established and clearly presented.

We are, in addition, skeptical about the level of economic activity assumed to be resulting from implementation of the selected alternative. No 1 information is presented to support the likelihood of securing an "aircraft 3.3 refurbishing and maintenance facility" as a tenant despite the fact the DEIS assumes, without foundation, that this will occur. No information is presented concerning the projected demand for "light industrial" properties in the region of impact, additional commercial or institutional facilities, or dwelling units. Given the economic performance of the region in the past several years, demand of this magnitude does not exist, nor is it expected to materialize in the foreseeable future. It is not apparent anywhere in the DEIS what factors will stimulate this demand.

3
4.1 We also believe that the feasibility of transferring portions of the base to other entities should be assessed. As much as possible, natural areas within the base's perimeter should be opened up for public access for hunting, fishing, trapping and other outdoor recreation. Specifically, the large undeveloped northwestern portion of the base may be better managed if

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11 APR 1993

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3
4.1 it is consolidated with contiguous state forest lands. Some portions of the base's southern fringe may also be better managed separately from the developed areas. And the existing small arms range should be conveyed to a local governmental unit or nonprofit organization so that it may be made available to the public.

4
10.5 We have significant concerns about the lack of information concerning remediation plans for contamination problems remaining from base operations. While the extent of the problem is characterized, no plan or schedule for clean-up operations or discussion of how the phasing of remedial actions could affect plan implementation is presented. Given the extensive history of contamination problems at the base, this important issue should have been addressed in far more detail in the DEIS.

In conclusion, for the reasons enumerated above, the Michigan United Conservation Clubs cannot endorse the proposed action or any other alternative assessed. Absence of significant information, lack of objective criteria for selection, and the vague and questionable assumptions about future use of base facilities have rendered support for any specific alternative impossible at this time.

On behalf of the MUCC, thank you for the opportunity to provide these comments.

Sincerely,

Richard K. Moore
Water Resource Specialist

Document 9

Paul L. Bruce
6955 North U.S. 23
Oscoda, MI. 48750

April 23, 1993

Lt. Col. Gary Baumgartel
AFCEE/ESE
8106 Chennault Rd.
Brooks AFB, Texas 78235-5318

Dear Lt. Col. Baumgartel:

I would like to offer comments on the Draft Environmental Impact Statement for Wurtsmith Air Force Base in Oscoda, Michigan on behalf of the Citizen's Advisory Committee on Wurtsmith AFB Contamination, Inc. and the Northeast Michigan Group of the Sierra Club's Mackinac Chapter. The Citizen's Advisory Committee on Wurtsmith AFB Contamination is a state-appointed group of Oscoda area residents whose primary objective is keeping the public informed about problems of toxic contamination at Wurtsmith and working towards the implementation of solutions to those problems. NEMG-Sierra Club is the regional entity of the Sierra Club, one of the nation's oldest and largest conservation organizations. The following comments are meant to reflect the shared concerns of both groups.

Before commenting on the content of the Draft Environmental Impact Statement (DEIS), I find it neccessary to remark 1 that the review period for the document is inadequate and 1.3 does not allow volunteer citizen's groups such as those I represent sufficent time to properly evaluate its content and prepare detailed comments. Therefore, comments on the DEIS will be general and limited to specific portions of the document.

2 The failure to include in the DEIS comments submitted at the EIS Scoping Meeting, held on November 7, 1991 in Oscoda is also reason for concern, especially in that the Air 1.4 Force claims that said comments have played an important role in the formulation of the DEIS. As one who attended and commented at that meeting, I feel that it is essential that the remarks made by a broad representation of community interests on that occasion be part of the DEIS document.

A final concern about the EIS process is in reference to 3 the list of organizations included in section S-1 of the 1.5 document, "Consultation and Coordination". Why was the Citizen's Advisory Committee on Wurtsmith AFB Contamination excluded from that list? The Citizen's Advisory Committee has been very active in its role of keeping the public informed about the toxic contamination at and emanating from

Document 9

3

1.5 Wurtsmith AFB. Over the past several years, the committee has conducted a series of informational meetings at which representatives of the Michigan Department of Natural Resources(MDNR) and the Michigan Department of Public Health have updated the community and the media on the
4 situation at Wurtsmith. The failure of the Air Force to
1.5 work with this citizen's group is most unfortunate and unwarranted, especially in light of the fact that the Air Force Technical Review Committee has a policy of excluding citizens and media from attending and participating in its meetings.

5 In addressing the content of the Draft Environmental Impact Statement, I find it necessary to emphasize that the docu-
10.6 ment is inadequate in that it does not have as its central focus the environmental restoration of Wurtsmith AFB and the surrounding area and the protection of the community from any additional environmental problems that may arise from the civilian redevelopment of the WAFB facilities. Wurtsmith has long been included on the MDNR 107c List of Most Contaminated Sites. Over fifty sites of toxic contamination have been cited by the Environmental Response Division of the MDNR. The DEIS does mention the environmental problems associated with Wurtsmith AFB:

(page 3-68) - "The highly permeable sand and gravel aquifer is extremely susceptable to contamination from surface chemical spills and leaking storage tanks"

"Groundwater underlying some areas of the base contains moderate to high levels of TCE, DCE, and benzene".

"The sewage lagoons on base have been operating on an expired discharge permit since 1988".

"The groundwater containing high levels of nitrogen could eventually migrate to the AuSable River".

The environmental problems are indeed extensive at the WAFB site. The U.S. Environmental Protection Agency has rated the base as significantly exceeding the minimum critera for listing on the Superfund National Priorities List. Plumes of contaminated groundwater are migrating from the base into adjacent Van Ettan Lake and the nearby AuSable River is contaminated at the Three Pipes discharge. The WAFB Northern Landfill is a known source of groundwater contamination. The Base sewage plant has contaminated a wetland habitat in the adjacent Huron-Manistee National Forest. Unfortunately

Document 9

the Air Force has made insufficent progress towards environmental restoration.

6 The EIS document fails to comment on the refusal of the Department of Defense to sign the September 1992 consent agreement proposed by the Michigan Attorney General and
1.6 the MDNR. The consent agreement was intended to serve as a legal blueprint for the clean-up of toxins at Wurtsmith AFB, establishing the responsibility and methodology for the remediation of all the contaminated sites and ensuring environmental restoration in accordance with the standards and guidelines of Michigan Act 307c. The consent agreement was endorsed by Governor John Engler, Representative Tom Alley, the Sierra Club, the Citizen's Advisory Committee on Wurtsmith AFB Contamination, and the Environmental Concerns Committee of the Wurtsmith Area Economic Adjustment Commission.

7 The Air Force states in the DEIS that it is undertaking environmental restoration at Wurtsmith according to the standards and guidelines of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Un-
10.7 fortunately CERCLA will not provide for prompt and comprehensive environmental restoration of the Wurtsmith site. Many of the contaminated sites listed by the MDNR would not be remediated by CERCLA, in particular petroleum(jet fuel) spills. CERCLA also does not provide for indemnification for future property recipients.

8 The Air Force also fails to adequately address the concerns about the WAFB sewage and water supply systems. Refering
9.2 to the malfunctioning sewage plant, the DEIS states on page 3-68 that " the new permit application (in progress) will include a request for a variance of effluent limitations."
9 A similar waiver of responsibility is given to problems
10.8 with asbestos on the base - page S-16: "Demolition or renovation of certain structures with Asbestos-containing materials would be the responsibility of new owners."

To summarize, there are a significant number of environmental concerns that will continue to demand attention after the scheduled closing of Wurtsmith AFB and at the present time there is no adequate plan for the resolution of those concerns. The conversion of Wurtsmith to civilian use will be undoubtably impacted by the environmental liabilities associated with the site.

10 The DEIS endorses a proposed action plan that calls for intensive development of the Wurtsmith site, including
10.9 re-use of the aviation facilities, industrial development, and renovation of the base housing. The DEIS fails to detail the numerous problems that could arise from such

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10 development. On page 4-25, the DEIS states: "Under the Proposed Action hazardous wastes generated would consist of waste oils, fuels, solvents, paints, thinners, and heavy metals." Many of these waste products are the same as those which are presently the source of the contamination problems at Wurtsmith. Why allow any activity that has the potential to contribute to already existing environmental problems?

10.9 On page 4-46, the DEIS states that: "Storm water discharge (non-point source) from the airfield, airfield support areas, and other heavy industrial areas may contain fuels, oils, and other residual contaminants which could degrade surface water resources in the AuSable River and Van Ettan Creek". Once again, why risk further environmental degradation by endorsing the same type of development - aviation related activities in particular - that has already caused toxic contamination?

11 The DEIS also makes the assumption that air quality would
13.1 not be affected by development in the Proposed Action plan. As there is a heavy industrial component in the plan that claim can not be substantiated.

In conclusion, the Air Force has stated that it has a new commitment to "Environmental Excellence". Unfortunately, the Draft Environmental Impact Statement for Wurtsmith Air Force Base shows little evidence of that commitment. Thank you for the opportunity to comment.

Sincerely,

Paul L. Bruce

Paul L. Bruce
Chair, NEMO Sierra Club
Chair, Citizen's Advisory Committee
on Wurtsmith AFB Contamination, Inc.

cc: Senator Carl Levin
Senator Donald Reigle
Representative James Barcia

Document 10

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

ROLAND HARMON, Director

Region II Headquarters
P.O. Box 128
Roscommon, Michigan 48653

April 26, 1993

Lt. Col. Gary Baumgartel
AFCEE/ESE
8106 Chennault Road
Brooks AFB, TX 78235-5318

Dear Colonel Baumgartel:

Attached are comments of the Environmental Response Division of the Michigan Department of Natural Resources regarding the Draft Environmental Impact Statement (DEIS) for Wurtsmith Air Force Base. As indicated in the comments, there are other Divisions within this Department, as well as other Departments, that may wish to provide comments on the DEIS.

Please do not hesitate to contact me at the number below if you have any questions or comments on the attached.

Sincerely,

Daniel Schultz
Regional Supervisor
ENVIRONMENTAL RESPONSE DIVISION
517-275-5151

DS:jf
enc.
cc: Mr. Donald Inman, MDNR
Mr. Larry Thornton, MDNR
Mr. Steve Takacs, MDNR
File/C.file

Document 10

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

District 7 Grayling Office
RR3, 1995 North I-75 BL
Grayling, Michigan 49738
April 21, 1993

TO: Dan Schultz, Region II Supervisor, Environmental Response Division

FROM: Steve M. Takacs, Geologist
Environmental Response Division, Grayling Office

SUBJECT: Wurtsmith AFB, Draft Environmental Impact Statement (DEIS)

I have reviewed the DEIS submitted by the U.S.A.F. dated March 1993. Most of the report centers on the effects that closure of WAFB will have on reuse of the property. A majority of the items addressed in the report should be reviewed by other state agencies including; Dept. of Agriculture, State Police Fire Marshal, Air Quality Division, Surface Water Quality Division, Waste Management Division and others as appropriate.

Items of specific concern to ERD are those that address known areas of soil and groundwater contamination, and the effect of closure on remedial activities at those sites.

1 Generally, the DEIS acknowledges the responsibilities of the U.S.A.F. to fulfill its obligations to leases, grants, permits, the court ordered consent decree and federal environmental regulations. It has, however, arbitrarily decided to meet certain 10.10 state environmental regulations while ignoring others. For instance, the U.S.A.F. has agreed to follow the State of Michigan State Police Fire Marshal requirements for abandonment and reuse of UST's but has not agreed to meet Michigan's cleanup standards under NERA.

2 The Great Lakes and Mid-Atlantic Hazardous Substance Research Center (GLHAC) is proposing to establish a facility at WAFB for 3.4 research of bioremediation of certain identified IRP sites. The U.S.A.F. and GLHAC should coordinate these activities with approvals from this Department.

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3 Table 2.7-2. outlines the summary of environmental impacts from the proposed action and other reuse alternatives. ERD's primary concern is what effects each of the reuses will have on soils, groundwater and remedial actions at IRP sites.
10.11

Table 2.7-2. does not indicate remedial actions at IRP sites will be affected in any way other than possible delays in disposition of some parcels of land. If the U.S.A.F. continues to meet its obligations, this will remain true.

4 The table does identify potential soil and groundwater impacts
11.2 resulting from activities associated with the Fire Training
12.3 Alternative. Runoff from burn areas could adversely impact the environment. Any of these activities must be designed to prevent the release of contaminants to the environment. Waste Management Division should be contacted regarding prevention measures.

5 Section 3.2.4.2 discusses wastewater issues. It is not clear who
9.3 will be responsible for operation of the sewage lagoons after the U.S.A.F. leaves. Impacts from the current lagoons would have to be monitored to insure contaminant levels do not exceed regulatory levels.

6 Section 3.1.3. It should be noted that the EPA has proposed WAFB
10.12 for listing on the NPL.

The remainder of the report appears to address the concerns of this Division.

cc: Inman
Thornton

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MAY 13 1993 REPLY TO THE ATTENTION OF

5HE-19J

Lt. Col. Gary Baumgartel
Department of the Air Force
AFCEE/ESE
8106 Chennault Road
Brooks AFB, Texas 78235-5318

Dear Lt. Col. Baumgartel:

In accordance with our responsibility under the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, we have reviewed the Draft Environmental Impact Statement (EIS) for the Disposal and Reuse of Wurtsmith Air Force Base (AFB) in Iosco County, Michigan. The closure and reuse of Wurtsmith AFB is consistent with the requirements of the Defense Base Closure and Realignment Act which mandates realignment and reduction of the Nation's military forces.

Wurtsmith Air Force Base encompasses 4,626 acres within its established boundaries, and includes an airfield, aviation support facilities, industrial facilities, public recreation facilities, a cantonment area and a residential area. Of this acreage, only 12 percent is actually owned by the Air Force, and the remaining 88 percent is fee-owned and will automatically revert to the previous ownership after closure of the base. The goal of the Air Force is to dispose of its 568 acres of Wurtsmith AFB property through transfer and/or conveyance to other State or local government agencies or private parties, according to the Draft EIS.

The purpose of the Draft EIS is to assess the environmental impacts of various reuse alternatives relative to the current, baseline condition. For this reason, the Draft EIS does not contain detailed information on contaminated groundwater plumes caused by past activities on the base. These groundwater impacts have been significant, as indicated in a Management Action Plan for the base that was issued at the same time as the Draft EIS. The Management Action Plan is not a NEPA document, but our Waste Management Division provided us a copy so that our two division's areas of responsibility with respect to Wurtsmith AFB could be integrated. The Management Action Plan contains detailed information for some 51 contaminated groundwater sites at the base, but no information beyond the location of these sites is included in the Draft EIS.

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Despite the appearance of significant omissions, we support the purpose of the Draft EIS to assess only those impacts associated with reuse activities relative to the existing condition. This strategy is consistent with the Interagency document, :"Base Closure and Environmental Review Manual: Information to Aid in the NEPA Review Process of BRAC Decisions." According to this document, base closures are to be handled under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Superfund Amendments and Reauthorization Act (SARA) process when environmental impacts include hazardous substances. Otherwise, base closure is handled by the NEPA process. The presence of hazardous substances and associated impacts to groundwater at Wurtsmith AFB cannot be disputed. Remedial investigations and cleanup activities at the base are currently being handled under a Consent Decree between the Air Force and the State of Michigan. This Consent Decree has been in place since November 1980. In addition to meeting the requirements of the Consent Decree, the Air Force will conduct all Installation Restoration Program activities in a manner consistant with Section 120 of CERCLA, as amended by SARA, according to the Management Action Plan.

Although the base is presently not on the Superfund National Priorities List, this listing is expected to occur in the near future. Wurtsmith AFB is currently being evaluated by the Superfund Site Assessment program, pursuant to Section 120 of SARA of 1986. The SARA regulations indicate that all Federal facilities listed on the Federal Facility docket, including Wurtsmith AFB, must be assessed for placement on the National Priorities List. This is done by evaluating information from a Preliminary Assessment and Site Inspection, which then leads to the preparation of a Hazard Ranking System package. Information provided by Wurtsmith AFB was evaluated and was found to be sufficient for Preliminary Assessment, Site Inspection and the Hazard Ranking System. The draft Hazard Ranking System package is currently being prepared by a U.S. EPA contractor and will be sent to U.S. EPA Headquarters upon review by Region 5 staff. Our Agency's Waste Management Division plans on submitting the package to Headquarters in the near future. Following Headquarter's review and approval, the site will be proposed for the National Priorities List. Although our Agency is unable to identify definite dates when these actions will take place, this process is proceeding and is ultimately expected to result in the inclusion of Wurtsmith AFB on the National Priorities List.

Four alternatives were evaluated in Draft EIS for consideration of reuse at Wurtsmith AFB. These four alternatives include: 1) redevelopment for industrial, commercial, residential, and recreational use (the proposed option), 2) full redevelopment plus the addition of a fire training center in the northwestern region of the base, 3) extensive recreational use of base area, with light industrial and commercial use but no residences, and

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4) no-action, meaning the area is left in a care-taker status, with no planned use. The first of these alternatives is presumably preferred since it is identified in the Draft EIS as the proposed action. Although we have some environmental concerns with this alternative, we prefer it to the fire training center alternative. The northeast portion of the base contains wetlands and other ecological resources that would be impacted by the fire training activities.

1 We have several groundwater concerns with the alternatives in the Draft EIS. Redevelopment plans should recognize that public water supply wells are nearby and residences or businesses may be
12.4 within the future wellhead protection area. Proximity of proposed development and activities to these wells should be considered in land use zoning plans. The Final EIS should identify the location of these wells, and consider how impacts would be avoided within wellhead protection areas. Also,
2 selection of the fire training alternative could lead to groundwater contamination via improperly constructed fire
12.5 training pits. Plans for fire training facilities will need to include ground-water protection measures, such as lined pits, proper storage of training chemicals, and proper disposal of wastes. If the fire training alternative is selected, then implementation of these mitigation measures should be committed to in the Final EIS.

The proposed redevelopment alternative could be successfully enacted with minimal environmental impact, provided that future industries and development projects adhere to State and Federal environmental regulations. The major concern for redevelopment is the extent of contamination already present on site. The Superfund program reports three trichloroethylene (TCE) plumes in ground water; perhaps even more areas are contaminated. Discussion of base remediation, however, appears to be outside the scope of this document, and will be addressed in the CERCLA/SARA process.

Based on our review and in accordance with our policy, we have rated the Draft EIS as "EC-2". The "EC" means that we have an environmental concerns with the proposed alternative, and the "2" means additional information is necessary to fully assess all impacts. Our concerns will be satisfied when the locations of nearby public water supplies are identified, and additional information is provided concerning the avoidance of impacts to wellhead protection areas. These concerns should be addressed in the Final EIS and Record of Decision.

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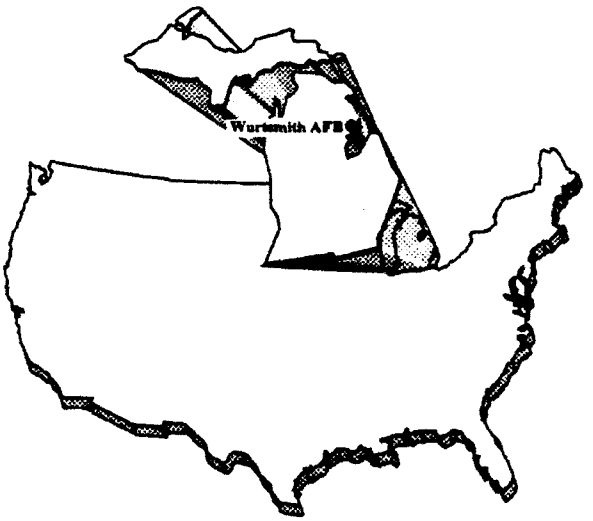
Thank you for the opportunity to review the Draft Environmental Impact Statement for the Disposal and Reuse of Wurtsmith Air Force Base. If you have any questions regarding our comments, please contact Hilo Andersen of my staff at (313) 884-2967.

Sincerely yours,

for William D. Franz, Acting Chief
Planning and Assessment Branch
Planning and Management Division



APPENDICES

APPENDIX A

APPENDIX A

GLOSSARY OF TERMS AND ACRONYMS/ABBREVIATIONS

GLOSSARY OF TERMS

Accident Potential Zones (APZs). Safety zones delineated using operational information derived from the base mission.

Advisory Council on Historic Preservation. A 19-member body appointed, in part, by the President of the United States to advise the President and Congress and to coordinate the actions of federal agencies on matters relating to historic preservation, to comment on the effects of such actions on historic and archaeological cultural resources, and to perform other duties as required by law (Public Law 89-655; 16 U.S. Code §470).

Aesthetics. Referring to the perception of beauty.

Air Installation Compatible Use Zone (AICUZ). An area delineated as part of an Air Force program to minimize development that is incompatible with aviation operation in areas on or adjacent to military airfields.

Aircraft operation. A takeoff or landing at an airport.

Alluvium. Clay, silt, sand, gravel, or similar material deposited by running water.

Ambient Air Quality Standards. Standards established on a state or federal level that define the limits for airborne concentrations of designated "criteria" pollutants (nitrogen dioxide, sulfur dioxide, carbon monoxide, total suspended particulates, ozone and lead), to protect public health with an adequate margin of safety (primary standards) and to protect public welfare, including plant and animal life, visibility, and materials (secondary standards).

Apron. An area on an airport intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refueling, or maintenance.

Aquifer. The water-bearing portion of subsurface earth material that yields or is capable of yielding useful quantities of water to wells.

Asbestos. A carcinogenic substance formerly used widely as an insulation material by the construction industry; often found in older buildings.

Attainment area. A region that meets the National Ambient Air Quality Standards for a criteria pollutant under the Clean Air Act.

Average Annual Daily Traffic (AADT). For a one-year period, the total traffic volume passing a point or segment of a highway facility in both directions, divided by the number of days in the year.

Benzene. Colorless, volatile, flammable, toxic, liquid aromatic hydrocarbon.

Biophysical. Pertaining to the physical and biological environment, including the environmental conditions crafted by man.

Boreal forest. A northern evergreen forest comprising mainly fir, pine, and spruce.

Canopy. The uppermost branchy layer of a forest.

Cantonment. The main developed portion of a military base containing administrative and community support facilities.

Capacity (roadway). The maximum rate of flow at which vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic, and control conditions.

Carbon monoxide (CO). A colorless, odorless, poisonous gas produced by incomplete fossil-fuel combustion. One of the six pollutants for which there is a national ambient standard. See Criteria pollutants.

Class I, II, and III Areas. Area classifications, defined by the Clean Air Act, for which there are established limits to the annual amount of air pollution increase. Class I areas include international parks and certain national parks and wilderness areas; allowable increases in air pollution are very limited. Air pollution increases in Class II areas are less limited, and are least limited in Class III areas. Areas not designated as Class I start out as Class II and may be reclassified up or down by the state, subject to federal requirements.

Clear Zone. The immediate end of a runway, where the probability of accidents is highest and most land uses are discouraged.

Commercial aviation. Aircraft activity licensed by state or federal authority to transport passengers and/or cargo for hire on a scheduled or nonscheduled basis.

Comprehensive Plan. A public document, usually consisting of maps, text, and supporting materials, adopted and approved by a local government legislative body, which describes future land uses, goals, and policies.

Contaminants. Undesirable substances rendering something unfit for use.

Control Zone. Controlled airspace which extends upward from the surface of the earth and terminates at the base of the continental control area. Control zones that do not underlie the continental control area have no upper limit. A control zone may include one or more airports and is normally a circular area with a radius of 5 statute miles and any extensions necessary to include instrument approach and departure paths.

Conveyance. The transfer of property from federal ownership to a non-federal group or agency.

Corrosive. A material that has the ability to cause visible destruction of living tissue and has a destructive effect on other substances. An acid or a base.

Council on Environmental Quality (CEQ). Established by the National Environmental Policy Act (NEPA), the CEQ consists of three members appointed by the President. CEQ regulations (40 CFR 1500-1508, as of July 1, 1986) described the process for implementing NEPA, including preparation of environmental assessments and environmental impact statements, and the timing and extent of public participation.

Criteria pollutants. The Clean Air Act required the Environmental Protection Agency to set air quality standards for common and widespread pollutants after preparing "criteria documents" summarizing scientific knowledge on their health effects. Today there are standards in effect for six "criteria pollutants": sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter equal to or less than 10 microns in diameter (PM_{10}), nitrogen dioxide (NO_2), ozone (O_3), and lead (Pb).

Cultural resources. Prehistoric and historic districts, sites, buildings, objects, or any other physical evidence of human activity considered important to a culture, subculture, or a community for scientific, traditional, religious, or any other reason.

Cumulative impacts. The combined impacts resulting from all activities occurring concurrently at a given location.

Day-Night Average Sound Level (DNL). The 24-hour average-energy sound level expressed in decibels, with a 10-decibel penalty added to sound levels between 10:00 p.m. and 7:00 a.m. to account for increased annoyance due to noise during night hours.

Decibel (dB). A unit of measurement on a logarithmic scale which describes the magnitude of a particular quantity of sound pressure or power with respect to a standard reference value.

Dichloroethylene (DCE). A product of trichloroethylene decomposition.

Disposal. Legal transfer of Air Force property to other ownership.

Easement. A right or privilege (agreement) that a person may have on another's property.

Effluent. Waste material discharged into the environment.

Endangered species. A species that is threatened with extinction throughout all or a significant portion of its range.

Environmental Impact Analysis Process. The process of conducting environmental studies as outlined in Air Force Regulation 19-2.

Erosion. Wearing away of soil and rock by weathering and the action of streams, wind, and underground water.

Fleet mix. Combination of aircraft used by a given agency.

Floodplain. The lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands; including, at a minimum, that area subject to a 1 percent or greater change of flooding in any given year.

Frequency. The time rate (number of times per second) that the wave of sound repeats itself, or that a vibrating object repeats itself--now expressed in Hertz (Hz), formerly in cycles per second (cps).

Friable. Easily crumbled or reduced to powder.

General aviation. All aircraft which are not commercial or military aircraft.

General Development Plan (GDP). A plan regulating long-range development and resource management within a city.

Geomorphic. Pertaining to the form of the earth or its surface features.

Groundwater. Water within the earth that supplies wells and springs.

Habituate. To become accustomed to frequent repetition or prolonged exposure.

Hydrocarbons. Any of a vast family of compounds containing hydrogen and carbon. Used loosely to include many organic compounds in various combinations; most fossil fuels are composed predominately of hydrocarbons. Hydrocarbons in the atmosphere mix with nitrogen oxides in the presence of sunlight to form ozone.

Hydrology. A science dealing with the properties, distribution, and circulation of water both above and below the earth's surface.

Impacts. An assessment of the meaning of changes in all attributes being studied for a given resource; an aggregation of all the adverse effects, usually measured using a qualitative and nominally subjective technique. In this EIS, as well as in the CEQ regulations, the word impact is used synonymously with the word effect.

Infrastructure. The basic installations and facilities on which the continuance and growth of a local community, state, etc., depend (roads, schools, power plants, transportation and communication systems, etc.)

Interstate. The designated National System of Interstate and Defense Highways located in both rural and urban areas; they connect the east and west coasts and extend from points on the Canadian border to various points on the Mexican border.

Lacustrine. Of or having to do with a lake or lakes.

L_{eq}. The equivalent steady state sound level which in a stated period of time would contain the same acoustical energy as time-varying sound level during the same period.

L_{max}. The highest A-weighted sound level observed during a single event of any duration.

Lead (Pb). A heavy metal used in many industries, which can accumulate in the body and cause a variety of negative effects. One of the six pollutants for which there is a national ambient air quality standard. See Criteria pollutants.

Level of service (LOS). In transportation analyses, a qualitative measure describing operational conditions within a traffic stream and how they are perceived by motorists and/or passengers. In public services, a measure describing the amount of public services (e.g., fire protection and law enforcement services) available to community residents, generally expressed as the number of personnel providing the services per 1,000 population.

Lithic scatter. Concentration of stone chipped artifacts.

Loudness. The qualitative judgment of intensity of a sound perceived by a human being.

Masking. The action of bringing one sound (audible when heard alone) to inaudibility or to unintelligibility by the introduction of another sound.

Military Operations Area. Airspace areas of defined vertical and lateral limits established for the purpose of separating certain training activities, such as air combat maneuvers, air intercepts, and acrobatics, from other air traffic operating under instrument flight rules.

Mineral resources. Mineral deposits that may eventually become available; known deposits not recoverable at present or yet undiscovered.

Mitigation. A method or action to reduce or eliminate program impacts.

Multi-family housing. Townhouse or apartment units that accommodate more than one family, although each dwelling unit is occupied by only one household.

National Ambient Air Quality Standards (NAAQS). Section 109 of the Clean Air Act requires the Environmental Protection Agency to set nationwide standards, the National Ambient Air Quality Standards, for widespread air pollutants. Currently, six pollutants are regulated by primary and secondary NAAQS: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter equal to or less than 10 microns in diameter, and sulfur dioxide. See Criteria pollutants.

National Environmental Policy Act (NEPA). Public Law 91-190, passed by Congress in 1969. The Act established a national policy designed to encourage consideration of the influences of human activities (e.g., population growth, high-density urbanization, industrial development) on the natural environment. NEPA also established the Council on Environmental Quality. NEPA procedures require that environmental information be made available to the public before decisions are made. Information contained in NEPA documents must focus on the relevant issues in order to facilitate the decision-making process.

National Priorities List. A list of sites (federal and state) where releases of hazardous materials may have occurred and may cause an unreasonable risk to the health and safety of an individuals, property, or the environment.

National Register of Historic Places. A register of districts, sites, buildings, structures, and objects important in American history, architecture, archaeology, and culture, maintained by the Secretary of the Interior under authority of Section 2(b) of the Historic Sites Act of 1935 and Section 101(a)(1) of the National Historic Preservation Act of 1966, as amended.

Native Americans. Used in a collective sense to refer to individuals, bands, or tribes who trace their ancestry to indigenous populations of North America prior to Euro-American contact.

Nitrogen dioxide (NO_2). Gas formed primarily from atmospheric nitrogen and oxygen when combustion takes place at high temperature. NO_2 emissions contribute to acid deposition and formation of atmosphere ozone. One of the six pollutants for which there is a national ambient standard. See Criteria pollutants.

Nitrogen oxides (NO_x). Gases formed primarily by fuel combustion, which contribute to the formation of acid rain. Hydrocarbons and nitrogen oxides combine in the presence of sunlight to form ozone, a major constituent of smog.

Noise. Any sound that is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying (unwanted sound).

Noise attenuation. The reduction of a noise level from a source by such means as distance, ground effects, or shielding.

Noise contour. A line connecting points of equal noise exposure on a map. Noise exposure is often expressed using the average day-night sound level, DNL.

Nonattainment area. An area that has been designated by the Environmental Protection Agency or the appropriate state air quality agency, as exceeding one or more National or State Ambient Air Quality Standards.

100-year floodplain. See floodplain.

Operable Unit. One or more IRP sites grouped together because of similar geographic area, types of contamination, or cleanup methods.

Operating Location (OL). An organizational element of the Air Force Base Disposal Agency located at a closing base. The OL is responsible for the care and custody of closed areas of the base, disposal of real and related personal property, and environmental cleanup. This office is the primary point of contact for local community reuse organizations and the general public who deal with the disposal and reuse of the base.

Ozone (ground level). A major ingredient of smog. Ozone is produced from reactions of hydrocarbons and nitrogen oxides in the presence of sunlight and heat. One of the six pollutants for which there is a national ambient standard. See Criteria pollutants.

Ozone precursors. Emitted air pollutants that chemically combine to produce ozone in the presence of sunlight.

Particulate matter (PM_{10}). Solid particles consisting of dust, soot, and various types of chemical species that have been emitted into the atmosphere and can remain suspended for several days or weeks. Particulate matter equal to or less than 10 microns in diameter (PM_{10}) can be hazardous to human health because it is small enough to penetrate the lung's natural defenses and may contain toxic or other chemicals that present a health concern. One of the six pollutants for which there is a national ambient standard. See Criteria pollutants.

PCBs. See Polychlorinated biphenyls.

PCB-contaminated equipment. Equipment which contains a concentration of polychlorinated biphenyls (PCBs, see definition) from 50 to 499 ppm and is regulated by the EPA.

PCB equipment. Equipment which contains a concentration of PCBs of 500 ppm or greater and is regulated by the EPA.

Permeability. The capacity of a porous rock or sediment to transmit a fluid.

Pesticides. Any substance, organic or inorganic, used to destroy or inhibit the action of plant or animal pests; the term thus includes insecticides, herbicides, fungicides, rodenticides, miticides, fumigants, and repellents. All pesticides are toxic to humans to a greater or lesser degree. Pesticides vary in biodegradability.

Physiographic province. A region in which all parts are similar in geologic structure and climate.

Pleistocene. An earlier epoch of the Quaternary period during the "ice age" beginning approximately 3 million years ago and ending 10,000 years ago. Also refers to the rocks and sediments deposited during that time.

Plume. An elongated mass of contaminated fluid moving with the flow.

PM_{10}. See Particulate matter.

Polychlorinated biphenyls (PCBs). Any of a family of industrial compounds produced by chlorination of biphenyl. These compounds are noted chiefly as an environmental pollutant that accumulates in organisms and concentrates in the food chain with resultant pathogenic and teratogenic effects. They also decompose very slowly.

Potable water. Suitable for drinking.

Prevention of Significant Deterioration (PSD). In the 1977 Amendments to the Clean Air Act, Congress mandated that areas with air cleaner than required by national ambient air quality standards must be protected from significant deterioration. The Clean Air Act's PSD program consists of two elements: requirements for best available control technology on major new or modified sources, and compliance with an air quality increment system.

Prevention of Significant Deterioration Area. A requirement of the Clean Air Act that limits the increases in ambient air pollutant concentrations in attainment areas to certain increments even though ambient air quality standards are met.

Primary roads. A consolidated system of connected main roads important to regional, statewide, and interstate travel; they consist of rural arterial routes and their extensions into and through urban areas of 5,000 or more population.

Prime farmland. Environmentally significant agricultural lands protected from irreversible conversion to other uses.

Reactive organic gases (ROGs). Reactive organic gases in the form of hydrocarbons that combine photochemically with nitrogen oxides to produce ozone.

Recent. The time period from approximately 10,000 years ago to the present and the rocks and sediments deposited during that time.

Remediation. The process of removing or detoxifying environmental contamination.

Restricted area. Designated airspace in which aircraft activity, while not prohibited, is subject to certain restrictions.

Reuse. Development plan for use of former Air Force property after base closure.

Richter scale. A logarithmic scale for measurement of the energy released by an earthquake.

Runway protection zones (RPZs). The zone beyond the end of the runway area usable for takeoff or landing.

Sediment. Material deposited by wind or water.

Single-family housing. A conventionally built house consisting of a single dwelling unit occupied by one household.

Site. As it relates to cultural/resources, any location where humans have altered the terrain or discarded artifacts.

Sludge. A heavy, slimy deposit, sediment, or mass resulting from industrial activity; solids removed from wastewater.

Soil association. Two or more soils occurring together in a characteristic pattern.

Solvent. A substance that dissolves or can dissolve another substance.

Sound. The auditory sensation evoked by the compression and rarefaction of the air or other transmitting medium.

State Historic Preservation Officer (SHPO). The official within each state, authorized by the state at the request of the Secretary of the Interior, to act as liaison for purposes of implementing the National Historic Preservation Act.

State Implementation Plan (SIP). Program developed for those areas of the state that are not in attainment of criteria air pollutant standards.

Statute Mile. Unit of distance equal to 5,280 feet.

Sulfur dioxide (SO_2). A toxic gas that is produced when fossil fuels, such as coal and oil, are burned. SO_2 is the main pollutant involved in the formation of acid rain. SO_2 also can irritate the upper respiratory tract and cause lung damage. The major source of SO_2 in the United States is coal-burning electric utilities. One of the six pollutants for which there is a national ambient standard. See Criteria pollutants.

Therm. A measurement of units of heat equal to 100,000 British thermal units (BTUs).

Threatened species. Plant and wildlife species likely to become endangered in the foreseeable future.

Toluene. Liquid aromatic hydrocarbon used as a solvent.

Total suspended particulates (TSP). The particulate matter in the ambient air. The previous national ambient air quality standard for particulates was based on TSP levels; it was replaced in 1987 by an ambient standard based on PM_{10} levels.

Traffic volume. The number of vehicles passing a point on a lane, roadway, or other trafficway during some time interval.

Transfer. Deliver U.S. Government property accountability to another federal agency.

Trichloroethylene (TCE). An organic solvent used in dry cleaning and removal of grease from metal.

Trip distribution. A determination of the interchange of trips among zones in the region.

Trip generation. A determination of the quantity of trip ends associated with a parcel of land.

U.S. Environmental Protection Agency (EPA). The independent federal agency, established in 1970, that regulates federal environmental matters and oversees the implementation of federal environmental laws.

Wetlands. Areas that are inundated or saturated with surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil. This classification includes swamps, marshes, bogs, and similar areas. Jurisdictional wetlands are those wetlands that meet the hydrophytic vegetation, hydric soils, and wetland hydrology criteria under normal circumstances (or meet the special circumstances as described in the CE, 1987 wetland delineation manual where one or more of these criteria may be absent and are a subset of "waters of the United States."

Xylene. *Liquid aromatic hydrocarbon used as a solvent.*

Zoning. The division of a municipality (or county) into districts for the purpose of regulating land use, types of building, required yards, necessary off-street parking, and other prerequisites to development. Zones are generally shown on a map and the text of the zoning ordinance specifies requirements for each zoning category.

ACRONYMS/ABBREVIATIONS

AADT	average annual daily traffic
ACC	Air Combat Command
ACM	asbestos-containing material(s)
ADT	average daily traffic
AFB	Air Force Base
AFBDA	Air Force Base Disposal Agency
AFR	Air Force Regulation
af/yr	acre-feet per year
AGE	aerospace ground equipment
AHERA	Asbestos Hazard Emergency Response Act
AICUZ	Air Installation Compatible Use Zone
ALP	Airport Layout Plan
APZ	Accident Potential Zone
AREFS	Air Refueling Squadron
ARTCC	Air Route Traffic Control Center
ATC	air traffic control
BMW	Bombardment Wing
CAA	Clean Air Act
CE	Civil Engineering
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COCESS	Contractor Operated Civil Engineering Supply System
CO	carbon monoxide
CPCO	Consumers Power Company
CZ	Clear Zone
dB	decibel
DBCRA	Defense Base Closure and Realignment Act
DCE	dichloroethylene
DD	Decision Document
DEIS	Draft Environmental Impact Statement
DERP	Defense Environmental Restoration Program
DNL	day-night average sound level
DOD	Department of Defense
DOT	Department of Transportation (federal)
DRMO	Defense Reutilization and Marketing Office
EDMS	Emissions and Dispersion Modeling System
EIS	Environmental Impact Statement
EIAP	Environmental Impact Analysis Process
EOD	explosive ordnance disposal

EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FBO	Fixed Base Operator
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FPMR	Federal Property Management Regulations
FS	Feasibility Study
GDP	General Development Plan
GLMAC	Great Lakes and Mid-Atlantic Hazardous Substance Research Center
GOCESS	Government Operated Civil Engineering Supply System
GSA	General Services Administration
HHS	Department of Health and Human Services
HMTA	Hazardous Materials Transportation Act
HUD	U.S. Department of Housing and Urban Development
HWMP	Hazardous Waste Management Plan
IFR	instrument flight rules
INM	Integrated Noise Model
IRP	Installation Restoration Program
JP-4	jet fuel
kV	kilovolt
kVA	kilovolt amperes
L_{dn}	abbreviation of DNL
L_{eq}	equivalent sound level
L_{max}	A-weighted maximum sound level
LOS	level of service
MAAQS	Michigan Ambient Air Quality Standards
MBTU	Million British Thermal Units
MDNR	Michigan Department of Natural Resources
MDOT	Michigan Department of Transportation
MERA	Michigan Environmental Response Act
$\mu g/m^3$	micrograms per cubic meter
MG	million gallons
MGD	million gallons per day
MichCon	Michigan Consolidated Gas Company
MOA	Military Operations Area
MOGAS	motor vehicle gasoline
mph	miles per hour
MSA	Metropolitan Statistical Area
MSL	mean sea level
MSDS	Material Safety Data Sheet
MTR	military training route
MWH	megawatt-hours

NAAQS	National Ambient Air Quality Standards
NCO	non-commissioned officer
NCP	National Contingency Plan
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFADD	No Further Action Decision Document
NHPA	National Historic Preservation Act
NLR	noise level reduction
NO_2	nitrogen dioxide
NOI	Notice of Intent
NOISEMAP	Noise Exposure Model
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
O_3	ozone
OL	Operating Location
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PA/SI	Preliminary Assessment/Site Inspection
PCBs	polychlorinated biphenyls
pCi/l	picocuries per liter
P.L.	Public Law
PM_{10}	particulate matter equal to or less than 10 microns in diameter
ppb	parts per billion
POL	petroleum, oils, and lubricants
ppm	parts per million
PSD	Prevention of Significant Deterioration
RA	Remedial Action
RAPCON	Radar Approach Control
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
ROG	reactive organic gases
ROI	Region of Influence
RPZ	runway protection zone
SAC	Strategic Air Command
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SEL	sound exposure level

SHPO	State Historic Preservation Officer
SI	Site Inspection
SIP	State Implementation Plan
SO_2	sulfur dioxide
TCE	trichloroethylene
TRACON	terminal radar approach control
TSCA	Toxic Substances Control Act
TSP	total suspended particulates
U.S.C.	U.S. Code
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VFR	visual flight rules
VOC	volatile organic compounds
VOR	very high frequency omnidirectional range
VTEs	vehicle trip ends
WAEAC	Wurtsmith Area Economic Adjustment Commission
WBCA	Wurtsmith Base Conversion Authority
WSA	Weapons Storage Area
WWTP	wastewater treatment plant

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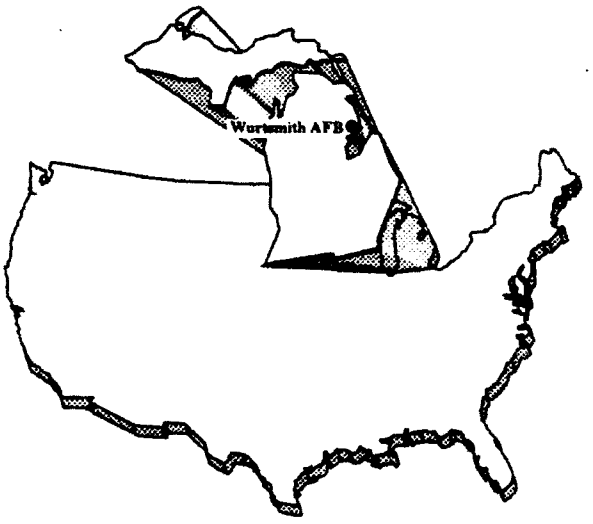

APPENDIX B

APPENDIX B

NOTICE OF INTENT

The following notice of intent was circulated and published by the Air Force in the October 9, 1991 Federal Register in order to provide public notice of the Air Force's intent to prepare an Environmental Impact Statement of disposal and reuse of Wurtsmith Air Force Base. This Notice of Intent has been retyped for clarity and legibility.

Please Note: The point of contact for information on the disposal and reuse environmental impact statements has been changed. The new point of contact is:

Lt. Colonel Gary P. Baumgartel
AFCEE/ESE
8106 Chennault Road
Brooks AFB, Texas 78235-5318

NOTICE OF INTENT

TO PREPARE ENVIRONMENTAL IMPACT STATEMENTS FOR DISPOSAL AND REUSE OF THIRTEEN AIR FORCE BASES

The United States Air Force will prepare thirteen environmental impact statements (EISs) to assess the potential environmental impacts of disposal and reuse of the following Air Force bases recently directed to be closed under the provisions of the Defense Base Closure and Realignment Act of 1990 (Public Law 101-510, Title XXIX):

Closing Base

Bergstrom AFB, Austin, Texas

Carswell AFB, Fort Worth, Texas

Castle AFB, Merced, California

Eaker AFB, Blytheville, Arkansas

England AFB, Alexandria, Louisiana

Grissom AFB, Peru, Indiana

Loring AFB, Limestone, Maine

Lowry AFB, Denver, Colorado

Myrtle Beach AFB, Myrtle Beach, South Carolina

Richards Gebaur ARS, Kansas City, Missouri

Rickenbacker AGB, Columbus, Ohio

Williams AFB, Chandler, Arizona

Wurtsmith AFB, Oscoda, Michigan

Each EIS will address the disposal of the property to public or private entities and the potential impacts of reuse alternatives. All available property will be disposed of in accordance with provisions of Public Law 101-510 and applicable federal property disposal regulations.

The Air Force plans to conduct a scoping and screening meeting within the local area for each base during October and November 1991. Notice of the time and place of each meeting will be made available to public officials and local news media outlets once it has been finalized. The purpose of each meeting is to determine the environmental issues and concerns to be analyzed for the base disposal and reuse in that area, to solicit comments on the proposed action and to solicit proposed disposal and reuse alternatives that should be addressed in the EIS for that base. In soliciting disposal and reuse inputs, the Air Force intends to consider all reasonable alternatives offered by any federal, state, or local government agency and any federally-sponsored or private entity or

individual with an interest in acquiring available property at one of the listed closing bases. The resulting environmental impacts will be considered in making disposal decisions to be documented in the Air Force's final disposal plan for each base.

To ensure the Air Force will have sufficient time to consider public inputs on issues to be included in the EISs, and disposal alternatives to be included in the final disposal plans, comments and reuse proposals should be forwarded to the address listed below by December 1, 1991. However, the Air Force will accept comments at the address below at any time during the environmental impact analysis process.

For further information concerning the study of these base disposal and reuse EIS activities, contact:

Lt. Colonel Tom Bartol
AFCEE/ESE
Norton AFB, California 92409-6448

Note: Comment date was extended from December 1, 1991 to January 2, 1992 after processing and publication of this Notice of Intent.

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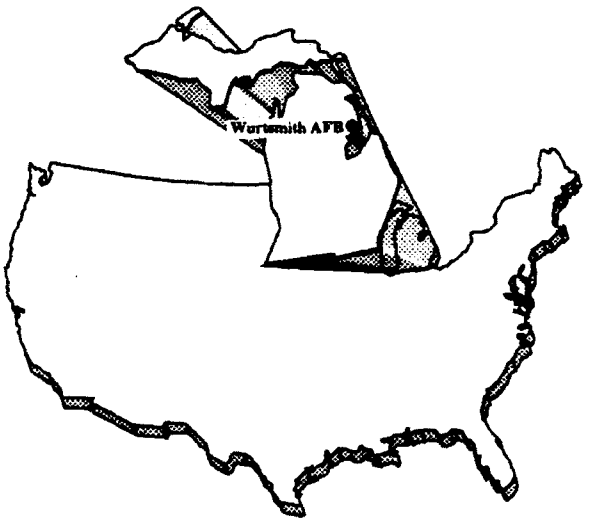


APPENDIX C

APPENDIX C

FINAL ENVIRONMENTAL IMPACT STATEMENT MAILING LIST

FINAL ENVIRONMENTAL IMPACT STATEMENT
MAILING LIST

This list of recipients includes interested federal, state, and local agencies and individuals who have expressed an interest in receiving the document. This list also includes the governor of Michigan, as well as United States senators and representatives and state legislators.

ELECTED OFFICIALS

Federal Officials

U.S. Senate

The Honorable Carl Levin
The Honorable Donald Riegle

U.S. House of Representatives

The Honorable James Barcia
The Honorable Joseph Knollenberg

State of Michigan Officials

Governor

The Honorable John Engler

State Legislature

The Honorable Tom Alley
The Honorable Connie Binsfield
The Honorable John Pridnia

Regional/Local Officials

The Honorable Robert Bolen
Mayor of East Tawas

The Honorable Edward Gall
Mayor of Harrisville

The Honorable James Lansky
Mayor of Tawas City

The Honorable Loren Wicoff
Mayor of Omer

GOVERNMENT AGENCIES

Federal Agencies

Administrative Services and Property Management
Office of the Secretary of Transportation

Advisory Council on Historic Preservation

Bureau of Mines

Bureau of Prisons
Chief, Facilities Development and Operations

Center for Environmental Health and Injury Control
Special Programs Group (F29)

Council of Economic Advisors

Department of Agriculture
Forest Service

Department of Commerce
Director, Economic Adjustment Division

Department of Commerce
Director, Office of Intergovernmental Affairs

Department of Education
Assistant to the Deputy Under Secretary for
Intergovernmental and Interagency Affairs

Department of Energy
Division of Intergovernmental Affairs (CP-23)

Department of Health and Human Services
Office of Human Development Services

Department of Housing and Urban Development
Director, Community Management Division (CPD)

Department of the Interior
Fish and Wildlife Service

Department of the Interior
National Parks Service

Department of the Interior
Director, Office of Environmental Affairs

Department of Labor
Intergovernmental Affairs

Federal Agencies (Continued)

Department of Veterans Affairs

Environmental Protection Agency, Headquarters
Director, Office of Federal Activities

Farmers Home Administration
Deputy Administrator for Program Operations

Federal Aviation Administration
Director, Office of Environmental and Energy

Federal Emergency Management Agency

General Services Administration
Assistant Commissioner for Real Estate Policy and Sales

Small Business Administration
Director, Office of Procurement

U.S. Army Corps of Engineers

Department of Defense

Department of Defense
Director, Office of Economic Adjustment

Regional Offices of Federal Agencies

Department of Agriculture
Huron National Forest
Forest Supervisor, Planning Group

Department of Housing and Urban Development
Chicago

Environmental Protection Agency, Region V
Chief, Planning and Environmental Review Branch

Federal Aviation Administration
Airports District Office
Belleville, Michigan

Federal Aviation Administration
Des Plains, Illinois

Federal Emergency Management Agency
Region V

General Services Administration
Office of Real Estate Sales

State of Michigan Agencies

Agricultural Department
Director

Bureau of History
State Historic Preservation Office

Corrections Department
Director

Department of Natural Resources

Department of Public Health
Director

Education Board
Director

Employment Security Commission
Director

Labor Department
Director

Office of Economic Development
Director

Social Services Department
Director

State Clearinghouse
Director

State Department
Secretary of State

State Department of Commerce
Director

State Housing Development Authority
Director

State Policy Director and Counsel to the Cabinet

Transportation Department
Director

Water Resources Commission
Director

Local Government Agencies

Au Sable Township
Supervisor

Greenbush Township
Supervisor

Iosco County Board of Commissioners

Marquette County RMDD
Mr. Jim Kippola

Oscoda High School
Community Education

Oscoda Township
Supervisor

Libraries

Alcona County Public Library

Alpena County Public Library

East Tawas Public Library

Oscoda Public Library

Saginaw Public Library

Saginaw Valley State University Library

OTHERS

Other Organizations/Individuals

Air Force Association
Huron Chapter

Alpena Chamber of Commerce

American Legion Post 274
Commander

American Operations Corporation
Ms. Kristi Field

Board of Realtors
Northeastern Area

Mr. John Burt

Other Organizations/Individuals (Continued)

Citizen's Advisory Committee on Wurtsmith AFB Contamination, Inc.
Mr. Paul R. Bruce

Mr. Edward Davison, Jr.

The Environmental Company, Inc.
Ms. Anne Tate

Environmental Defense Fund
Executive Director

Environmental Policy Center/Institute

Mr. Gilson Foster

Friends of the Earth

Great Lakes Mid-Atlantic Hazardous Sustance Research Center
Dr. Walter J. Weber, Jr., Center Director

Great Lakes United, Region II
Mr. John Witzke
Regional Director

Greenbush-Oscoda-Au Sable Lodging Association
Mr. John Mahler, President

Hale Area Chamber of Commerce

Huron Shores Business and Professional Women

Huron Shores Chamber of Commerce

Kiwanis Club, Oscoda

Knights of Columbus #5083

Lions Club, Oscoda

Masonic Lodge #243
Au Sable Lodge F&M

Ms. Margie Matts

Michigan Air Force Association
Mr. William Stone, President

Michigan United Conservation Clubs, Inc.

Other Organizations/Individuals (Continued)

Military Affairs Committee
Mr. Bruce Myles

National Audubon Society

National Audubon Society
Great Lakes Region

National Wildlife Federation

National Wildlife Federation, Region 7

Natural Resources Defense Council

The Nature Conservancy

The Nature Conservancy
East Lansing

Oscoda-Au Sable Chamber of Commerce

The Pathfinders

Ms. Ardeth Platte, O.D.

Rotary Club

R.T.I.

Saginaw Chamber of Commerce

Mr. Ronald E. Shorkey

Sierra Club

Sierra Club
Midwest Field Office

Standish Chamber of Commerce

Tawas City Chamber of Commerce

Tetra Tech, Inc.

Veterans of Foreign Wars Post #3735

Veterans of Foreign Wars Post #5678

West Branch Chamber of Commerce

Other Organizations/Individuals (Continued)

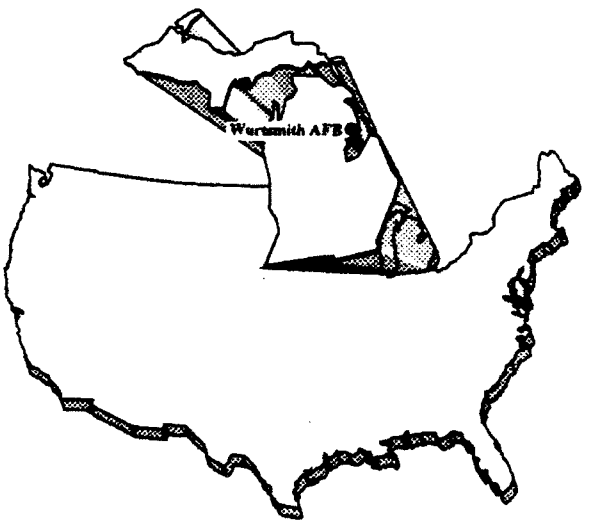
The Wilderness Society

The Wildlife Society
North Central Section

World Wildlife Fund

Wurtsmith Area Economic Adjustment Commission
Mr. Carl Sachs

Wurtsmith Base Conversion Authority
Mr. James Storey



APPENDIX D

APPENDIX D

WURTSMITH AIR FORCE BASE
INSTALLATION RESTORATION PROGRAM BIBLIOGRAPHY

WURTSMITH AIR FORCE BASE INSTALLATION RESTORATION PROGRAM BIBLIOGRAPHY

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APPENDIX E

APPENDIX E

METHODS OF ANALYSIS

METHODS OF ANALYSIS

1.0 INTRODUCTION

This section describes the methods used in preparing this environmental impact statement (EIS). These methods were designed and implemented to evaluate the potential environmental impacts of disposal and reuse of Wurtsmith Air Force Base (AFB). Since future reuse of the site is uncertain in its scope, activities, and timing, the analysis considered several alternative reuse scenarios and evaluated their associated environmental impacts. The reuse scenarios analyzed in this EIS were defined for this study to span the anticipated range of reuse activities that are reasonably likely to occur due to disposal of the base. They were developed based on proposals put forth by affected local communities, interested individuals, and the Air Force, and considered general land use planning objectives.

The various analysis methods used to develop this EIS are summarized here by resource. In some instances, more detail is included in another appendix. These instances are noted for each resource in its respective subsection below.

2.0 LOCAL COMMUNITY

2.1 COMMUNITY SETTING

The section on community setting was developed to provide the context within which other biophysical impacts could be assessed. Community setting impacts were based on projected land use, direct and secondary employment, and resulting population changes related to reuse of Wurtsmith AFB. Demand on transportation systems was determined by using population, employment, and land use projections. Land use also influenced impacts on community service, air quality, and noise. A complete assessment of socioeconomic effects was conducted through a separate *Socioeconomic Impact Analysis Study (SIAS) for the Disposal and Reuse of Wurtsmith AFB,* which is the source for baseline and projected population and employment statistics used in this EIS.

The SIAS used information from sources including the U.S. Bureau of Economic Analysis, U.S. Bureau of Labor Statistics, Michigan Employment Security Commission, Michigan Department of Management and Budget, the Northeastern Michigan Council of Governments, and the townships of Au Sable, Greenbush, and Oscoda. The analysis used the Regional Interindustry Multiplier System (RIMS II) model to generate demographic and economic projections associated with the Proposed Action and alternatives.

2.2 LAND USE AND AESTHETICS

Potential land use impacts were projected based on compatibility of land uses associated with the Proposed Action and alternatives with adjacent land uses and zoning, consistency with general plans and other land use plans and regulations, and effects of aircraft noise and safety restrictions on land uses.

The region of influence (ROI) for the majority of direct land use impacts for this study consisted of Wurtsmith AFB, the townships of Oscoda (surrounding the base) and Au Sable within Iosco County, and portions of Alcona County. Noise-related land use impacts were determined by the extent of noise contours created by reuse activities.

Maps and windshield surveys were used to characterize on- and off-base land uses. Applicable policies, regulations, and land use restrictions were identified from the available land use plans and ordinances of the township of Oscoda. The proposed and alternative reuse plans were compared to existing land use and zoning, as well as to local subdivision regulations, to identify areas of conflict. The other land use concepts were also examined for compatibility with adjacent land uses and with the Proposed Action and alternatives using the same process.

The Proposed Action was examined for consistency with Federal Aviation Administration (FAA) regulations and recommended land uses in the vicinity of airfields. Impacts of airfield- generated noise were assessed by comparing the extent of noise-affected areas and receptors under different reuse alternatives against preclosure baseline conditions.

For aesthetics analysis, the affected environment was described based upon the visual sensitivity of areas within and visible from the base. Modified to reflect the perceived high aesthetic values evoked by the area's visual resources, these areas were categorized as of high, medium, or low sensitivity. The Proposed Action and alternatives were then evaluated to identify land uses to be developed, visual modifications that would occur, and new areas of visual sensitivity and to determine whether modification of unique or otherwise irreplaceable visual resources could occur and detract from the visual qualities or setting. Consistency with applicable plans that protect visual resources was also examined.

2.3 TRANSPORTATION

Potential impacts to transportation due to the Proposed Action and alternative reuse plans for Wurtsmith AFB focus on key roads, local airport use, and passenger rail service in the area, including those segments of the transportation networks in the region that serve as direct or indirect linkages to the base. The need for improvements to on-base roads, off-base

accesses, and regional arterials was considered. The analysis was developed using information from state and local government agencies, including the Michigan Department of Transportation and the Iosco County Road Commission, local airport authorities, and railroad companies. Other data sources used for the roadway analysis include planning guides prepared by the Institute of Transportation Engineers. The ROI for the transportation analysis includes the townships of Au Sable and Oscoda, with emphasis on the area surrounding Wurtsmith AFB.

The number of vehicle trips expected as a result of specific land uses on the site was estimated for the years 1993, 1998, 2003, and 2013 on the basis of direct on-site jobs and other attributes of on-site land uses (such as the number of dwelling units, commercial and industrial development, and other factors). Trip Generation Data from the Institute of Transportation Engineers was used to determine vehicle trips. Vehicle trips were then allocated to the local road network using prior patterns and expected destinations and sources of trips. Changes in work and associated travel patterns were derived by assigning or removing traffic to or from the most direct commuting routes. Changes in traffic volumes arising from reuse alternatives at Wurtsmith AFB were estimated and resulting volume changes on key local roadways were then determined.

The transportation network in the ROI was then examined to identify potential impacts to levels of service (LOS) arising from future baseline conditions (No-Action Alternative) and effects of reuse alternatives. Planning computations from the Highway Capacity Manual were used to determine the LOS. The planning application provided estimates of traffic and anticipated LOS where the amount of detail and accuracy of information was limited. The planning procedures used in this analysis were based on forecasts of average daily traffic and on assumed traffic, roadway, intersection, and control conditions. The results provided a basic assessment of whether or not capacity was likely to be exceeded for a given volume, as well as an estimate of the changes in LOS expected as a result of traffic volume changes on key local roadways.

Airspace use in the vicinity of an airport is driven primarily by such factors as runway alignment, surrounding obstacles and terrain, air traffic control and navigational aid capabilities, proximity of other airports/airspace uses in the area, and noise considerations. These same factors normally apply regardless of whether the airport is used for military or civil aircraft operations. For this reason, a preclosure reference was used in characterizing these factors related to airspace use at Wurtsmith AFB.

Historic data on military aircraft operations used to characterize airspace use at and around Wurtsmith AFB were obtained from the base. The Michigan Department of Transportation and airport owners/operators were contacted to obtain information on civil airport use. Aviation forecasts were derived

from the Michigan Department of Transportation studies and, where necessary, assumptions were made based on other similar airport operational environments.

The ROI for the airspace analysis is an area extending from the surface up to 12,000 feet mean sea level and covering the 30-nautical mile radius of Wurtsmith AFB. This airspace represents the area delineated to Wurtsmith by the FAA Terminal Radar Approach Controls (TRACONs) at Minneapolis and Cleveland.

The types and levels of aircraft operations projected for the Proposed Action were evaluated and compared to the way airspace was configured and used under the preclosure reference. The capacity of the airport to accommodate the projected aircraft fleet and operations was assessed by calculating the airport service volume, using the criteria in the FAA Advisory Circular 150/5060-5. Potential effects on airspace use were assessed, based on the extent to which projected operations could (1) require modifications to the airspace structure or air traffic control systems and/or facilities; (2) restrict, limit, or otherwise delay other air traffic in the region; or (3) encroach on other airspace areas and uses. It was recognized throughout the analysis process that a more in-depth study would be conducted by the FAA, once a reuse plan is selected, to identify any impacts of the reuse activities and what actions would be required to support the projected aircraft operations. Therefore, this analysis was used only to consider the level of operations that likely could be accommodated under the existing airspace structure, and to identify potential impacts if operational capacities were exceeded.

Data addressing private, passenger, and cargo air service in the region were acquired directly from air transportation studies of the area. The effect of base closure on local airports was derived by subtracting current base-related enplanements from current total enplanements.

Information regarding existing rail transportation was obtained from AMTRAK and the Detroit and Mackinac rail system. Projected effects of reuse alternatives on railroad transportation were based on projected populations, using current passenger to population ratios. Population figures were used since none of the alternatives assumes direct use of local railroads.

2.4 UTILITIES

Utility usage was determined based on land uses and projected area population increases. The utility systems addressed in this analysis include the facilities and infrastructure used for potable water (pumping, treatment, storage, and distribution), wastewater (collection and treatment), solid waste (collection and disposal), and energy generation and distribution (electricity and natural gas). Historic consumption data, service curtailment

data, peak demand characteristics, storage and distribution capacities, and related information for base utilities (including projections of future utility demand for each utility provider's particular service area) were extracted from various engineering reports and the Wurtsmith AFB Comprehensive Plan. Information was also obtained from public and private utility providers and related county and city agencies.

The ROI for this analysis comprised the communities of Oscoda, Au Sable, Tawas City, and East Tawas, and part of Baldwin Township. It was assumed that the local providers of potable water, wastewater treatment, and energy that serve Wurtsmith AFB and the surrounding area would continue services within the area of the existing base after closure.

Potential impacts were evaluated based on long-term projections of demand and population derived from data obtained from the various utility providers within the region for each of their respective service areas. These projections were then adjusted to reflect the decrease in demand associated with closure of Wurtsmith AFB and its subsequent operation under caretaker status. These adjusted forecasts were then considered the future baseline for comparison with potential reuse alternatives.

The potential effects of reuse alternatives were evaluated by estimating and comparing the additional direct and indirect demand associated with each alternative to the existing and projected operating capabilities of each utility system. Estimates of direct utility demands on site were used to identify the effects of the reuse activities on site-related utility systems. All changes to the utility purveyors' long-term forecasts were based on estimated project-related population changes in the region and the future rates of per-capita demand explicitly indicated by each purveyor's projections or derived from those projections. It was assumed that the regional per-capita demand rates were representative of the reuse activities, based on assumed similarities between proposed land uses and existing or projected uses in the region. Projections in the utilities analysis include direct demand associated with activities planned on base property, as well as resulting changes in domestic demand associated with population changes in the region.

3.0 HAZARDOUS MATERIALS AND HAZARDOUS WASTE MANAGEMENT

Two categories of hazardous materials and hazardous waste management issues were addressed for this analysis: (1) impacts of hazardous materials utilized and hazardous wastes generated by each reuse proposal and (2) residual impacts associated with past Air Force practices including delays due to Installation Restoration Program (IRP) site remediation. IRP sites were identified as part of the affected environment (Chapter 3), while remediation impacts associated with these sites were addressed as environmental consequences (Chapter 4). Impacts of wastes generated by each reuse proposal were also addressed in Chapter 4. Primary sources of

data were existing published reports such as IRP documents, management plans for various toxic or hazardous substances (e.g., spill response, hazardous waste, asbestos), and survey results (e.g., radon). Pertinent federal, state, and local regulations and standards were reviewed for applicability to the Proposed Action and alternatives. Hazardous materials and waste management plans and inventories were obtained from Wurtsmith AFB. Interviews with personnel associated with these on-base agencies provided the information necessary to fill any data gaps. City and county agencies were also contacted regarding regulations which would apply to both current and post-closure activities for Wurtsmith AFB.

The ROI encompasses the current base property, including the off-site former World War II Bombing Range, as well as all geographical areas that have been affected by an on-base release of a hazardous substance. All IRP sites are currently within the base boundary except the Three Pipes Outfall, which is located south of the base on the Au Sable River. The ROI also includes groundwater contamination plumes that have migrated off base. Three plumes flow into Van Etten Lake, to the east and northeast of the base, and the Fire Training Area Plume flows into a wetland area located southwest of the base.

4.0 NATURAL ENVIRONMENT

4.1 SOILS AND GEOLOGY

Evaluation of soils impacts addressed erosion potential, construction-related dust generation and other soils problems (low soil strength, expansive soils, etc.), and disturbance of unique soil types. Information was obtained from several federal, state, and local agencies. Assessment of potential impacts to geology from the reuse alternatives included evaluation of resource potential (especially aggregates), geologic hazards (particularly potential for seismicity, liquefaction, and subsidence), and flooding potential.

The soils analysis was based on a review of Soil Conservation Service (SCS) documents for soil properties. The soils in the ROI were then evaluated to determine erosion potential, permeability, evidence of hardpans, expansive soil characteristics, etc., as these relate to construction problems and erosion potential during construction. Mitigations were evaluated based on county ordinances and SCS recommendations. Common engineering practices were reviewed to identify poor soil characteristics and recommended mitigation measures.

The ROI for the geologic analysis included the region surrounding Wurtsmith AFB relative to seismic activity, aggregate resources, and flooding potential. The ROI for the soils analysis was limited to the base and specific areas designated for construction or renovation.

The geologic analysis was based on a review of existing literature for construction problems associated with geologic hazards, availability of construction aggregate, and whether reuse would impact the availability of known mineral resources.

4.2 WATER RESOURCES

Analysis of impacts of the reuse alternatives on water resources considered groundwater quality and quantity, surface water quality (effects from erosion or sedimentation and contamination), surface water drainage diversion, and non-point source surface runoff to the Au Sable River and Van Etten Creek. Impacts to water quality resources resulting from IRP activities were addressed under Hazardous Materials and Hazardous Waste Management. Information was obtained from several federal, state, and local agencies. The ROI for water resources included the groundwater basin underlying the base, the surface drainage directly affected by runoff from the base, and the 100-year floodplain in the vicinity of the base.

Existing surface water conditions were evaluated for flood potential, non-point source discharge or transportation of contaminants, and surface water quality. Groundwater resources were evaluated as they pertained to adequate water supplies for each of the reuse alternatives. Groundwater quality and its potential as a potable water source for each reuse alternative were documented. The existing storm water drainage system was evaluated based on available literature, and the impacts to this system from each of the reuse alternatives were determined.

4.3 AIR QUALITY

The air quality resource is defined as the condition of the atmosphere, expressed in terms of the concentrations of air pollutants occurring in an area as the result of emissions from natural and/or man-made sources. Reuse alternatives have the potential to affect air quality depending on net changes in the release of both gaseous and particulate matter emissions. The impact of these emission changes was determined by comparing the resulting atmospheric concentrations to state and federal ambient air quality standards. The analysis drew from baseline emission inventory information, construction scheduling information, project-related source information, and transportation data. Principal sources of these data were the U.S. Environmental Protection Agency, the Michigan Department of Natural Resources, the Iosco County Chamber of Commerce, the Engineering Services Center of the FAA, the Wurtsmith AFB environmental coordinators, and the base engineer.

The ROI was determined by emissions from sources associated with construction and operation of the reuse alternatives. For pollutant emissions other than ozone precursors, the measurable ROI is limited to a few miles

downwind of the source (i.e., the immediate area of Wurtsmith AFB). The ROI for ozone impacts from project emissions included Iosco County.

Emissions predicted to result from the proposed reuse alternatives (see Appendix K for the projected emissions inventory and methods of calculation) were compared to existing baseline emissions to determine the potential for adverse air quality impact. Impacts were also assessed by modeling using the Emissions and Dispersion Modeling System (EDMS) or the EPA SCREEN model, as appropriate. Emissions from aircraft and motor vehicle activities in the Proposed Action and motor vehicle operations in the Fire Training and Recreation alternatives were evaluated to determine potential impacts using temporal data and peak-hour activities as input to the EDMS model. Peak-hour emission rates for a dirty evolution fire and a forest fire burning simultaneously were calculated and modeled using the EPA SCREEN model, as described in Appendix K. For the Fire Training Alternative, EDMS modeling results for motor vehicle activity were combined with SCREEN modeling results for fire training activities to evaluate total impacts. In addition to the normal array of receptor sites, receptors were placed at the base hospital and within the residential area where the potential of exposure of sensitive individuals and/or long-term exposure exists. Estimated impacts from all alternatives were added to background pollutant levels and compared to state and federal air quality standards and Prevention of Significant Deterioration (PSD) allowable increments.

4.4 NOISE

The noise analysis addressed potential noise impacts from reuse-generated aircraft operations, surface traffic, and other identified noise sources on communities surrounding Wurtsmith AFB. Most of the data were obtained from the aircraft operations and traffic data prepared for the reuse alternatives. Day-night levels (DNL) were used to determine noise impacts. A single-event noise analysis using sound exposure levels (SEL) was also performed. Scientific literature on noise effects was also referenced.

The ROI for noise was defined as the area within DNL 65 decibels (dB) contours based on land use compatibility guidelines developed from FAA regulations (FAA, 1989b). The ROI for surface traffic noise impacts incorporated key road segments identified in the transportation analysis.

Noise levels from aircraft operations were estimated using the FAA-developed Integrated Noise Model (INM) version 3.10. Noise contours for DNL 65 dB and above were depicted. Noise levels due to surface traffic were estimated using the Federal Highway Administration's Highway Noise Model (1978). Potential noise impacts were identified by overlaying the noise contours with land use and population information to determine the number of residents who would be exposed to DNL of 65 dB or greater.

SELs related to reuse alternatives were provided for representative noise-sensitive receptors exposed to aircraft noise from the Wurtsmith airfield. The SELs presented were outdoor levels and took into account the location of the receptors relative to the various flight tracks and aircraft profiles used. Noise reduction effects for common construction were included in the sleep interference analysis; however, evaluation of sensitive receptors relative to noise reduction levels of specific structures was not performed.

Methods used to analyze noise impacts under each reuse scenario are presented in detail in Appendix J of this EIS.

4.5 BIOLOGICAL RESOURCES

Biological resources addressed in the closure and reuse of Wurtsmith AFB included vegetation, wildlife, threatened and endangered species, and sensitive habitats. Primary sources of data included published literature and reports, the Michigan Natural Features Inventory, field reconnaissance of the base (April 1992), and contacts with agencies such as the U.S. Fish and Wildlife Service and the Michigan Department of Natural Resources. Vegetation and sensitive resources were mapped using aerial photographs and field visits. The ROI for the biological resources assessment comprised Wurtsmith AFB and other areas that could be directly or indirectly affected by the reuse alternatives. Wetlands on the base were delineated using the methods set forth in the *Wetlands Delineation Manual* (U.S. Army Corps of Engineers, 1987). The vegetation and wetlands maps were entered into the computerized geographical information system (GIS).

Acreages of each habitat type that could be disturbed by the proposed reuse alternatives were determined by overlaying project maps with vegetation and sensitive habitat maps. The total acreages of disturbance for each land use type were assumed to occur anywhere within the polygons listed for that land use, unless more specific locational information was available on land use related activities. Other impacts were qualitatively assessed based on literature data and scientific judgment on the responses of plants and animals to project-related disturbances such as noise, landscaping, and vegetation maintenance. Reasonable assumptions were made as to potential impacts of land use types based on project descriptions given in Chapter 2. Feasible mitigation measures were suggested to decrease impacts.

4.6 CULTURAL RESOURCES

Cultural resources generally include three main categories: prehistoric resources, historic structures and resources, and traditional resources. For the purposes of this EIS, cultural resources were defined to also include paleontological resources: the fossil evidence of past plant and animal life. Prehistoric resources are places where human activity has measurably

altered the earth or left deposits of physical remains. Historic structures and resources include standing structures and other physical remains of historic significance. Traditional resources are topographical areas, features, habitats, plants, animals, minerals, or archaeological sites that contemporary Native Americans or other groups value presently, or did so in the past, and consider essential for the persistence of their traditional culture. Cultural resources of particular concern include properties listed on the National Register of Historic Places (NRHP), properties potentially eligible for the NRHP, and sacred Native American sites and areas.

Data used to compile information on these resources were obtained from existing environmental documents; material on file at Wurtsmith AFB; recent cultural resource reports pertaining to the base; and interviews with individuals familiar with the history, archaeology, or paleontology of the area. The ROI for cultural resources includes all areas within the boundaries of Wurtsmith AFB.

According to NRHP criteria (36 Code of Federal Regulations [CFR] 60.4), the quality of significance is present in districts, sites, buildings, structures, and objects that:

(a) Are associated with events that have made a significant contribution to the broad patterns of history

(b) Are associated with the lives of persons significant in the past

(c) Embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic value; or represent a significant and distinguishable entity whose components may lack individual distinction

(d) Have yielded, or may be likely to yield, information important in prehistory or history.

To be listed in or considered eligible for listing in the NRHP a cultural resource must meet at least one of the above criteria and must also possess integrity of location, design, setting, materials, workmanship, feeling, and association. Integrity is defined as the authenticity of a property's historic identity, as evidenced by the survival of physical characteristics that existed during the property's historic or prehistoric occupation or use. If a resource retains the physical characteristics it possessed in the past, it has the capacity to convey information about a culture or people, historical patterns, or architectural or engineering design and technology.

Compliance with requirements of cultural resource laws and regulations ideally involves four basic steps: (1) identification of significant cultural resources that could be affected by the Proposed Action or its alternatives, (2) assessment of the impacts or effects of these actions, (3) determination

of significance of potential historic properties within the ROI, and (4) development and implementation of measures to eliminate or reduce adverse impacts. The primary law governing cultural resources in terms of their treatment in an environmental analysis is the National Historic Preservation Act (NHPA), which addresses the protection of archaeological, historic, and Native American resources. In compliance with the NHPA, the Air Force has initiated consultation with the State Historic Preservation Officer, as required under Sections 106 and 111 of the NHPA.

Adverse effects that may occur as a result of base reuse are those that have a negative impact on characteristics that make a resource eligible for listing on the NRHP. Actions that can diminish the integrity, research potential, or other important characteristics of a historic property include the following (36 CFR 800.9):

- Physical destruction, damage, or alteration of all or part of the property
- Isolating the property from its setting or altering the character of the property's setting when that character contributes to the property's qualification for the NRHP
- Introduction of visual or auditory elements that are out of character with the property or that alter its setting
- Conveyance of a federally owned property without adequate conditions or restrictions regarding its preservation, maintenance, or use
- Neglect of a property, resulting in its deterioration or destruction.

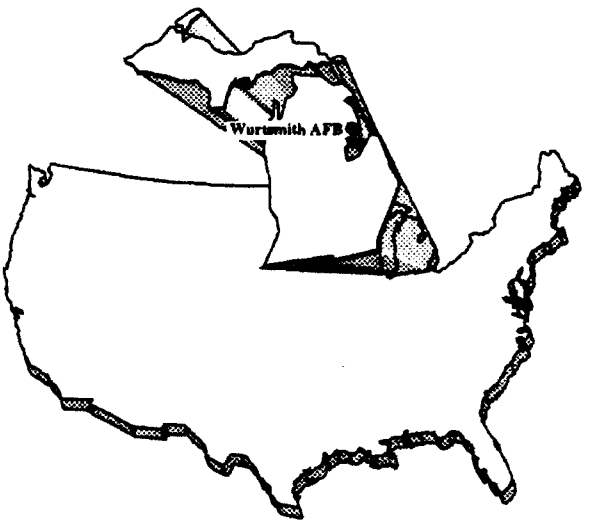
Regulations for implementing Section 106 of the NHPA indicate that the transfer, conveyance, lease, or sale of a historic property are procedurally considered to be adverse effects, thereby ensuring full regulatory consideration in federal project planning and execution. However, effects of a project that would otherwise be found to be adverse may not be considered adverse if one of the following conditions exists:

- When the historic property is of value only for its potential contribution to archaeological, historical, or architectural research, and when such value can be substantially preserved through the conduct of appropriate research, and such research is conducted in accordance with applicable professional standards and guidelines
- When the undertaking is limited to the rehabilitation of buildings and structures and is conducted in a manner that preserves the historical and architectural value of the affected historic property through conformance with the Secretary's Standards for

Rehabilitation and Guidelines for Rehabilitation of Historic Buildings

- When the undertaking is limited to the transfer, conveyance, lease, or sale of a historic property, and adequate restrictions or conditions are included to ensure preservation of the property's significant historic features.

The treatment of paleontological resources is governed by Public Law 74-292 (the National Natural Landmarks Program, implemented by 36 CFR 62). Only paleontological remains determined to be significant are subject to consideration and protection by a federal agency. Among the criteria used for National Natural Landmark designation are illustrative character, present condition, diversity, rarity, and value for science and education.



APPENDIX F

APPENDIX F

ENVIRONMENTAL PERMITS HELD BY WURTSMITH AIR FORCE BASE

ENVIRONMENTAL PERMITS HELD BY WURTSMITH AIR FORCE BASE

Permit No.	Permitted Facility/Equipment	Original Date Issued	Date of Expiration
Sewer Discharge			
MS0000640	Sewage treatment	October 28, 1983	October 31, 1988[a]
MI0042285	NPDES groundwater treatment systems (storm drain discharge)	April 20, 1989	October 31, 1993[b]
RCRA			
Interim Part A	Hazardous waste storage	July 6, 1982	September 30, 1993
Air Emissions			
27-861	Hospital pathological incinerator	July 2, 1987	Indefinite
96-86	Mission St. air strippers	June 18, 1988	Indefinite
141-88	California St. air strippers	June 6, 1988	Indefinite
439-84	Arrow St. air strippers	December 7, 1984	Indefinite
622-87	Central heat plant	November 16, 1987	Indefinite
107-92	Transportation paint booth	September 3, 1992	Indefinite
272-92	Soil Remediation Operation	June 30, 1992	Indefinite
239-92	Jet engine test cell	MDNR processing application	Pending approval

Notes: (a) Wurtsmith Air Force Base has applied for renewal.
(b) Application filed with MDNR Water Quality Division on April 1, 1993.
MDNR = Michigan Department of Natural Resources.
NPDES = National Pollutant Discharge Elimination System.
RCRA = Resource Conservation and Recovery Act.

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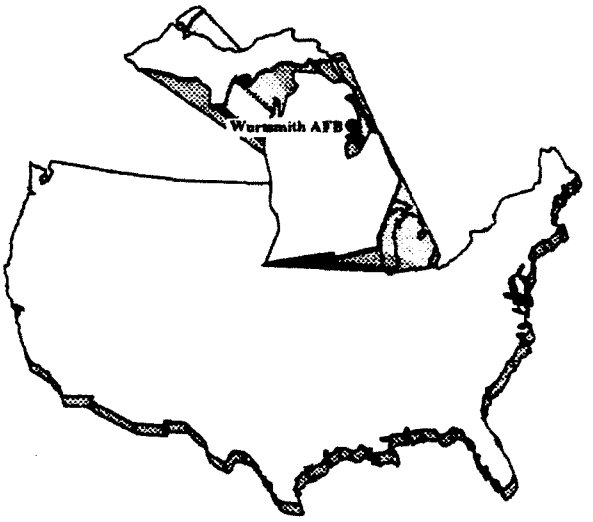

APPENDIX G

APPENDIX G

STORAGE TANKS AND PESTICIDE STORAGE AT WURTSMITH AIR FORCE BASE

Table G-1. Inventory of Active Underground Storage Tanks
Page 1 of 2

Facility Number	Capacity[a] (gallons)		Contents	Installation Date	Construction Material
42	1,000		Waste oils	1988	Steel
141	2,000		Waste pesticides	1990	Steel
361	2,000		Reclaimed JP-4	1959	Steel
460	550		Waste oils	1962	Steel
460	1,000		Fuel oil #2	1963	Steel
460	10,000		Unleaded gasoline	1980	Steel
460	20,000		Unleaded gasoline	1962	Steel
460	20,000		Unleaded gasoline	1984	Steel
1842	12,000		Diesel fuel	1963	Fiberglass
3000	2,000	[b]	Fuel oil #2	1983	Steel
3002	275	[b]	Fuel oil #2	1973	Steel
3010	550	[b]	Fuel oil #2	1957	Steel
5006	Unknown		Fuel/water	1984	Steel
5009	550		Waste oil	1984	Steel
5011	10,000		JP-4	1981	Steel
5013	70		Motor vehicle gasoline	Unknown	Steel
5031	1,000		Waste JP-4	1981	Steel
5045	1,500		Fuel oil #2	1964	Steel
5052	275	[b]	Diesel fuel	1957	Steel
5063	1,000		Waste oil	1992	Steel
5072	500		Waste hydraulic fluid	1980	Steel
5073	2,000		JP-4	1960	Steel
5073	50,000	(4)	JP-4	1960	Steel
5075	2,000		JP-4	1960	Steel
5075	50,000	(4)	JP-4	1960	Steel
5081	50,000		Leaded gasoline	1953	Steel
5081	12,000		JP-4	1953	Steel
5081	50,000		Diesel fuel	1953	Steel
5092	6,000		Waste oil	1987	Steel
5092	10,000	(2)	Aqueas Film Forming Foam	1987	Steel
5096	550	[b]	Fuel oil #2	1971	Steel
5109	6,000	[b]	Fuel oil #2	1974	Steel
5306	6,000	[b]	Fuel oil #2	1982	Steel

Notes: (a) Numbers in parentheses represent number of tanks when there are more than one at each location. Capacity is per tank.
(b) Unregulated tanks.

Table G-1. Inventory of Active Underground Storage Tanks
Page 2 of 2

Facility Number	Capacity[a] (gallons)		Contents	Installation Date	Construction Material
5328	550	[b]	Fuel oil #2	1971	Steel
5334	1,000	[b]	Fuel oil #2	1961	Steel
5335	550	[b]	Fuel oil #2	1970	Steel
5336	1,500	[b]	Fuel oil #2	1961	Steel
5337	2,000	[b]	Diesel fuel	1971	Steel
5338	550	[b]	Fuel oil #2	1971	Steel
5339	15,000		Unleaded gasoline	1972	Steel
5340	1,000	[b]	Fuel oil #2	1973	Steel
5346	550	[b]	Fuel oil #2	1971	Steel
5354	2,000		Diesel fuel	1971	Steel
5600	1,000	[b]	Fuel oil #2	1960	Steel
5608	1,000	[b]	Fuel oil #2	1983	Steel
7020	1,000		Wastewater	1990	Steel

Notes: (a) Numbers in parentheses represent number of tanks when there are more than one at each location. Capacity is per tank.
(b) Unregulated tanks.

Table G-2. Inventory of Active Aboveground Storage Tanks
Page 1 of 3

Facility Number	Capacity (gallons)		Contents	Installation Date	Construction Material
13	275		Diesel fuel	1990	Steel
25	275		Fuel oil #2	1952	Steel
43	500		Waste oil	1959	Steel
45	275		Diesel fuel	TBD	Steel
45	275		Fuel oil #2	1942	Steel
58	2,000		Diesel fuel	1992	Steel
140	1,000		Waste oil	1958	Steel
140	275		Diesel fuel	1990	Steel
190	70		Motor vehicle gasoline	1977	Steel
220	275		Diesel fuel	1959	Steel
290	25		Motor vehicle gasoline	1984	Steel
304	70		Motor vehicle gasoline	1960	Steel
305	275	(2)	Diesel fuel	1985	Steel
305	1,000		Liquid propane	1987	Steel
336	500		Liquid propane	1982	Steel
347	275		Fuel oil #2	1986	Steel
357	220		Fuel oil #2	TBD	Steel
357	440		Fuel oil #2	TBD	Steel
359	275		Diesel fuel	1958	Steel
387	2,000		Diesel fuel	1989	Steel
388	500		Waste oil	1964	Steel
388	500		Liquid propane	1986	Steel
401	5		Diesel fuel	1990	Steel
1107	1,000	(2)	Unleaded gas	1991	Steel
1119	275		Fuel oil #2	1987	Steel
1145	500		Liquid propane	1984	Steel
1842	2,000		Liquid propane	Unknown	Steel
3000	275		Diesel fuel	1992	Steel
3020	275		Fuel oil #2	1953	Steel
3029	21		Diesel fuel	1961	Steel
5002	275		Diesel fuel	1987	Steel
5002	275	(2)	Fuel oil #2	1988	Steel
5003	275	(2)	Fuel oil #2	1951	Steel
5006	275	(2)	Diesel fuel	1960	Steel
5009	275	(2)	Waste oil	1963	Steel
5031	1,000		Liquid propane	Unknown	Steel
5042	275		Motor vehicle gasoline	1979	Steel
5043	275		Waste oil	1983	Steel
5043	6,000		Fuel oil #2	1983	Steel

Note: Numbers in parentheses represent number of tanks when there is more than one at each location. Capacity is per tank.

Table G-2. Inventory of Active Aboveground Storage Tanks
Page 2 of 3

Facility Number	Capacity (gallons)	Contents	Installation Date	Construction Material
5046	275 (2)	Diesel fuel	1961	Steel
5048	275	Diesel fuel	1985	Steel
5050	275	Diesel fuel	TBD	Steel
5054	275	Diesel fuel	1959	Steel
5055	275	Diesel fuel	1979	Steel
5056	275	Motor vehicle gasoline	1959	Steel
5067	1,600	Waste oil	1980	Steel
5067	275 (2)	Waste oil	1959	Steel
5072	500	Waste oil	1982	Steel
5074	2,000	Diesel fuel	1988	Steel
5076	275	Motor vehicle gasoline	1960	Steel
5079	2,000	Diesel fuel	1984	Steel
5084	275	Diesel fuel	1991	Steel
5084	500	Diesel fuel	1991	Steel
5089	275	Diesel fuel	1987	Steel
5090	275	Diesel fuel	1989	Steel
5091	275	Diesel fuel	1990	Steel
5095	550	Diesel fuel	1960	Steel
5098	1,000	JP-4	1973	Steel
5110	400	Liquid oxygen	1963	Steel
5110	5,000	Liquid oxygen	TBD	Steel
5110	2,000	Liquid nitrogen	TBD	Steel
5131	275	Diesel fuel	TBD	Steel
5133	275 (3)	Diesel fuel	1982	Steel
5305	550	Carbon dioxide	1982	Steel
5350	1,000	Fuel oil #2	1992	Steel
5355	275	Fuel oil #2	1989	Steel
5363	275	Fuel oil #2	1986	Steel
5606	275	Fuel oil #2	1960	Steel
5608	275	Diesel fuel	Unknown	Steel
5608	500	Diesel fuel	Unknown	Steel
7000	1,260,000	JP-4	1960	Steel
7001	568,000	JP-4	1960	Steel
7002	25,000	Deicing fluid	1953	Steel
7003	25,000	Motor vehicle gasoline	1953	Steel
7004	25,000	Fuel oil #2	1953	Steel
7007	1,500	Waste oil	1987	Steel
7032	5,000	Diesel fuel	1952	Steel

Note: Numbers in parentheses represent number of tanks when there is more than one at each location. Capacity is per tank.

Table G-2. Inventory of Active Aboveground Storage Tanks
Page 3 of 3

Facility Number	Capacity (gallons)	Contents	Installation Date	Construction Material
7039	210,000	Fuel oil #2	1972	Steel
7040	315,000	Fuel oil #2	1972	Steel
7297	2,000 (2)	Diesel fuel	1991	Steel
7297	2,000 (2)	Motor vehicle gasoline	1991	Steel
7297	60	Diesel fuel	1986	Steel
8116	275	Fuel oil #2	1960	Steel
8123	70	Motor vehicle gasoline	1960	Steel
9012	40	Motor vehicle gasoline	1983	Steel

Note: Numbers in parentheses represent number of tanks when there is more than one at each location. Capacity is per tank.

Table G-3. Inventory of Inactive Storage Tanks (as of November 1991)

Facility Number		Capacity (gallons)	Number of Tanks	Contents
20	[a]	12,000	1	Unknown
1842	[a]	1,500	2	Filled with sand
5001	[a]	2,500	1	Unknown
5012	[a]	275	1	Filled with inert material
5046	[a]	2,500	1	Filled with inert material
5056	[a]	275	1	Filled with inert material
5079	[a]	2,500	1	Filled with inert material
5350	[a]	20,000	1	Fuel oil #2
5608	[a]	1,000	1	Fuel oil #2
8407		275	1	Fuel oil #2
8511		275	3	Fuel oil #2
8711		275	6	Fuel oil #2
8714		275	2	Fuel oil #2
8805		275	1	Fuel oil #2
8908		275	7	Fuel oil #2
9201		275	1	Fuel oil #2
9305		275	1	Fuel oil #2
9417		275	1	Fuel oil #2
9807		275	2	Fuel oil #2

Note: (a) Underground storage tank.

Table G-4. Pesticide Inventory (Buildings 140 and 141) (as of April 1992)
Page 1 of 2

Name	Quantity
Dursban 4E	10 gallons
Carbaryl (Sevin SL)	200 gallons
Malathion 57%	340 gallons
Malathion 95%	4 drums
Phillips 66 R-55 Repellent	40 gallons
Baygon 1.5	32 gallons
B-Gone	30 gallons
Baygon Bait	20 pounds
Diazinon	15 gallons
Diazinon 4E	2 gallons
Ficam W	10 pounds
Permadust PT 240	840 pounds
Spectracide 6000	600 pounds
Pyrethrin	5 gallons
Wasp Freeze	500 12-ounce cans
Eatons Bait Block	130 pounds
Rodenticide 4972	31 pounds
Rodenticide 4973	35 pounds
Avitrol	3 cans
Phostoxin 55% (for stored produce pests)	30 cans
Calcium Cyanide	2 pounds
Zinc Phosphide	10 fluid ounces
Creosote Oil	4 gallons
Dursban L.O.	1.2 quarts
Lindane 1%	6 ounces
Ortho-Klor 44 (Chlordane 44%)	1 gallon
Rodent Cake	100 pounds
Growth Retardant	165 gallons
ACME Vegetation Killer	5 gallons
Hydro Wet	5 gallons
Vegemec	10 gallons
Drift Proof	10 gallons
Tru Green	40 gallons

Table G-4. Pesticide Storage (Pest Management)
Page 2 of 2

Name	Quantity
Greenzit (Green Label)	25 gallons
Greenzit (Blue Label)	25 gallons
Embark 2-S	20 quarts
Maliec Hydrazide	165 gallons
Actidion Thiram Fungicide	11 pounds
Actidion Ferrated Fungicide (with ferrous sulfide activator)	8 pounds
Dymec 50 Fungicide	65 pounds
Topmec 70W Fungicide	15 pounds
Formec 80 Fungicide	100 pounds
Clearys Tank Cleaner	100 quarts
Trimec	75 gallons
Prometon 5%	100 pounds
Roundup	250 gallons
Pramitol 25E	200 gallons
Weed Killer	30 gallons
Broadleaf Herbicide	120 gallons
Mec Amine-D	200 gallons

Table G-5. Oil/Water Separators

Facility Number	Facility Description	Capacity (gallons)
42	Jet Engine Test Cell	1,000
43	Jet engine maintenance	60
140	Pavement/grounds shop	1,170
388	Arts and craft center/auto hobby shop	880
393	Refueling vehicle maintenance	4,365
394	Vehicle maintenance	4,365
394	Special purpose sump	780
394	General purpose sump	2,160
396	Vehicle operations heated parking	4,365
460	Base Exchange Service Station	675
5001	Jet Engine Test Cell	1,350
5009	Aerospace ground equipment maintenance	135
5031	Fire training facility	10,080
5043	Aerospace ground equipment trailer maintenance	5,100
5060	Aircraft maintenance - nose dock 2	11,670
5061	Aircraft maintenance - nose dock 4	11,670
5063	Aircraft maintenance - nose dock 7	1,980
5066	Aircraft corrosion control - nose dock 5	11,670
5067	Aircraft maintenance - nose dock 3	11,670
5068	Aircraft maintenance - nose dock 1	11,670
5092	Vehicle heated storage	12,030
5134	Weapons storage area - fire protection water storage	2,970

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APPENDIX H

APPENDIX H

AIR FORCE POLICY, MANAGEMENT OF ASBESTOS AT CLOSING BASES AND RESULTS OF ASBESTOS SURVEY AT WURTSMITH AIR FORCE BASE

AIR FORCE POLICY
MANAGEMENT OF ASBESTOS AT CLOSING BASES

Asbestos in building facilities is managed because of potential adverse human health effects. Asbestos must be removed or controlled if it is in a location and condition that constitutes a health hazard or a potential health hazard, or it is otherwise required by law (e.g., schools). The hazard determination must be made by a health professional (in the case of the Air Force, a Bioenvironmental Engineer) trained to make such determinations. While removal is a remedy, in many cases management alternatives (such as encapsulation within the building) are acceptable and cost effective methods of dealing with asbestos. The keys to dealing with asbestos are knowing its location and condition and having a management plan to prevent asbestos containing materials that continue to serve their intended purpose from becoming a health hazard. There is no alternative to such management, because society does not have the resources to remove and dispose of all asbestos in all buildings in the United States. Most asbestos is not now nor will it become a health hazard if it is properly managed.

There are no laws applicable to closure bases that specifically mandate the removal or management of asbestos in buildings other than the law addressing asbestos in schools (P.L. 99-519). Statutory or regulatory requirements that result in removal or management of asbestos are based on human exposure or the potential for human exposure (i.e., National Emission Standards for Hazardous Air Pollutants (NESHAP) = no visible emissions, OSHA = number of airborne fibers per cc). There are no statutory or other mandatory standards, criteria or procedures for deciding what to do with asbestos. Thus, health professional judgement based on exposure levels or potential exposure levels must be the primary determinant of what should be done with asbestos. Apart from this professional and scientific approach, closing bases present the additional problem of obtaining an economic return to the Government for its property. Asbestos in closing base properties must also be analyzed to determine the most prudent course in terms of removal or remediation cost and the price that can be obtained as a result.

The following specific policies will apply to bases closed or realigned (so that there are excess facilities to be sold) under the base closure laws, P.L. 100-526 and P.L. 101-510.

1. Asbestos will be removed if:

   (a) The protection of human health as determined by the Bioenvironmental Engineer requires removal (e.g., exposed friable asbestos within a building) in accordance with applicable health laws, regulations and standards

   (b) A building is unsalable without removal, or removal prior to sale is cost-effective; that is, the removal cost is low enough compared to value that would be received for a "clean" building that removal is a good investment for the Government. Prior to the decision to remove asbestos solely for economic reasons, an economic analysis will be conducted to determine if demolition, removal of some types of asbestos but not others, or asbestos removal and sale would be in the best interests of the Government.

(c) A building is, or is intended to be, used as a school or child care facility.

2. When asbestos is present but none of the above applies, the asbestos will be managed using commonly accepted standards, criteria and procedures to assure sufficient protection of human health and the environment, in accordance with applicable and developing health standards.

3. A thorough survey for asbestos (including review of facility records, visual inspection, and where appropriate as determined by the Bioenvironmental Engineer and the Base Civil Engineer, intrusive inspection) will be conducted by the air Force prior to sale.

4. Appraisal instructions, advertisements for sale, and deeds will contain accurate descriptions of the types, quantities, locations, and condition of asbestos in any real property to be sold or otherwise transferred outside the Federal Government. Appraisals will indicate what discount the market would apply if the building were to be sold with the asbestos in place.

5. Encapsulated asbestos in a building structure, friable or not, is not regarded as hazardous waste by the Air Force, nor does encapsulation within the structure of a building constitute "storing" or "disposing of" hazardous waste. Asbestos incorporated into a building as part of the structure has not been "stored" or "disposed of."

6. Friable asbestos, or asbestos that will probably become friable, that has been stored or disposed of underground or elsewhere on the property to be sold will be properly disposed of, unless the location is a landfill or other disposal facility properly permitted for friable asbestos disposal.

7. The final Air Force determination regarding the disposition of asbestos will be dependent on the plan for disposal and any reuse of the building. Decisions will take into account the proposed community reuse plan and the economic analysis of alternatives (see para 4). The course of action to be followed with respect to asbestos at each closing installation will be analyzed in the Disposal and Reuse Environmental Impact Statement, and will be included in the record of decision (ROD). Any buildings or facilities where the proposed asbestos plan is controversial will be addressed in the ROD, whether individually or as a class of closely related facilities.

8. Since other considerations must be taken in to account at bases that are continuing to operate, this policy does not apply to them, nor is it necessarily a precedent for asbestos removal policy on them.

This Air Force Policy on the Management of Asbestos at Closing Bases dated 1 May 1992 has been retyped for the purposes of clarity and legibility.

Table H-1. Facilities Surveyed for Asbestos, Wurtsmith Air Force Base, 1992
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Location (Facility No.)	Facility Description	Asbestos-Containing Material Present
5	Pavement and Grounds Facility	Roofing material
6	Maintenance Dock	Floor tile, roofing material, flexible duct/duct joint insulation, pipe fitting insulation
8	Radar Tower	No ACM identified
14	Base Operations	Tank and fitting insulation, flexible duct/duct joint insulation, ceiling plaster, ceiling tile, floor tile, wallboard, roofing material
16	Fire Station	Wallboard, ceiling tile
20	Fire Station	Pipe, fitting, and tank insulation, ceiling tile, floor tile, wallboard, roofing material
25	Maintenance Shop	Wallboard, ceiling tile, floor tile, roofing material
43	Jet Engine Maintenance Shop	Pipe, fitting, and tank insulation, wallboard, floor tile, roofing material
45	Fire Station	Ceiling tile, wallboard, roofing material
47	Maintenance Shop	Roofing material
50	Recreation Facility	Pipe fitting insulation, floor tile, roofing material
55	Base Personnel Office	Pipe and fitting insulation, ceiling tile, wallboard, floor tile, roofing material
57	Laboratory	Ceiling tile, floor tile, roofing material
58	Data Processing	Pipe fitting insulation, ceiling tile, wallboard, floor tile, roofing material
60	Supply and Equipment Warehouse	Pipe, fitting, and tank insulation, wallboard, wall and ceiling transite, ceiling tile, floor tile

Notes: The asbestos survey included representative samples taken from family housing structures with ACM being identified in wallboard, floor tile, and roofing materials.
ACM = Asbestos-containing material.

Table H-1. Facilities Surveyed for Asbestos, Wurtsmith Air Force Base, 1992
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Location (Facility No.)	Facility Description	Asbestos-Containing Material Present
70	Housing Supply and Storage Facility	Pipe, fitting, and equipment insulation, wallboard, textured wall surfacing, ceiling tile
120	Security Police Operations	Pipe and fitting insulation, wallboard, ceiling tile, floor tile, roofing material
140	Pavement and Grounds Facility	Pipe, fitting and tank insulation, floor tile, ceiling tile, wallboard, roofing material
190	Security Police Operations	Pipe, fitting, tank, and equipment insulation, wall tile, floor tile, ceiling tile, roofing material
201	Maintenance Shop	Pipe and fitting insulation, floor tile, ceiling tile, wallboard, roofing material
220	Communications Facility	Pipe and fitting insulation, flexible duct/duct joint insulation, wall tile, ceiling tile, floor tile, roofing material
225	Youth Center	Pipe, fitting, and tank insulation, wallboard, ceiling tile, floor tile, acoustic tile, roofing material
228	Education Center	Wallboard, ceiling tile, floor tile, roofing material
245	Readiness Crew	Pipe fitting, and equipment insulation, roofing material, wallboard, ceiling tile
287	Wash Rack	Roofing material
288	Storage Facility	Wallboard, ceiling tile, floor tile
290	Engineering Administration	Pipe fitting insulation, ceiling tile, wallboard, floor tile, roofing material
291	Engineering Administration	Floor tile, wallboard, ceiling tile, roofing material

Notes: The asbestos survey included representative samples taken from family housing structures with ACM being identified in wallboard, floor tile, and roofing materials.

Table H-1. Facilities Surveyed for Asbestos, Wurtsmith Air Force Base, 1992
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Location (Facility No.)	Facility Description	Asbestos-Containing Material Present
300	Gymnasium	Ceiling tile, wallboard, flexible duct/duct joint insulation, tank insulation, roofing material, floor tile
302	Water Supply Building	Ceiling tile, floor tile, wallboard, roofing material
303	Water Supply Building	Pipe and fitting insulation, roofing material
304	Water Supply Building	Roofing material
305	Heating Facility	Pipe, fitting, tank, and equipment insulation, ceiling tile, floor tile, wallboard, roofing material
306	Unknown	Wallboard, ceiling tile, floor tile, roofing material
307	Waste Treatment Building	Roofing material
334	Recreation Building	Pipe, fitting, and tank insulation, wallboard, floor tile, roofing material
340	Base Personnel Office	Attic insulation, pipe and fitting insulation, wall transite, wallboard, ceiling tile, floor tile, roofing material
351	Liquid Fuel Pump Station	Roofing material
355	Liquid Fuel Pump Station	Roofing material
361	Liquid Fuel Pump Station	Floor tile, roofing material
383	Traffic Management Facility	Pipe, fitting, and tank insulation, wallboard, miscellaneous wrap, ceiling tile, floor tile, roofing material, flexible duct/duct joint insulation
384	Hazardous Storage	Roofing material
385	Maintenance Shop	Pipe and fitting insulation, ceiling tile, floor tile, wallboard
388	Arts and Craft Center	Pipe fitting insulation, ceiling tile, wallboard, floor tile

Notes: The asbestos survey included representative samples taken from family housing structures with ACM being identified in wallboard, floor tile, and roofing materials.

Table H-1. Facilities Surveyed for Asbestos, Wurtsmith Air Force Base, 1992
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Location (Facility No.)	Facility Description	Asbestos-Containing Material Present
393	Refueling Vehicle Shop	Pipe and fitting insulation, floor tile, roofing material, miscellaneous materials
394	Vehicle Maintenance Shop	Pipe, fitting, and tank insulation, wallboard, ceiling tile, floor tile, roofing material
395	Vehicle Operations Administration	Pipe and fitting insulation, ceiling tile, floor tile, wallboard, roofing material
396	Vehicle Operation/Heating Parking	Pipe, fitting, and equipment insulation wallboard, ceiling tile, floor tile, roofing material
400	Base Exchange	Wallboard, ceiling tile, pipe fitting insulation, floor tile, roofing material
404	Commissary	No ACM identified
405	Exchange Service Outlet	Pipe and fitting insulation, roofing material, floor tile, ceiling tile, wallboard
410	Package Store	Pipe, fitting, and equipment insulation, floor tile, ceiling tile, wallboard, flexible duct/duct joint insulation, roofing material
420	Bowling Center	Pipe and equipment insulation, floor tile, ceiling tile, wallboard, ceiling transite
440	Theater	Pipe and fitting insulation, roofing material, floor tile, wall transite, ceiling plaster
445	Chapel Center	Pipe, fitting, and equipment insulation, wall and ceiling plaster, ceiling tile, floor tile, wallboard, roofing material
455	Recreation Center	Pipe, fitting, and tank insulation, flexible duct/duct joint insulation, roofing material, floor tile, wallboard

Notes: The asbestos survey included representative samples taken from family housing structures with ACM being identified in wallboard, floor tile, and roofing materials.
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Table H-1. Facilities Surveyed for Asbestos, Wurtsmith Air Force Base, 1992
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Location (Facility No.)	Facility Description	Asbestos-Containing Material Present
460	Exchange Service Station	Wallboard, ceiling tile, floor tile, roofing material
500	Dormitory	Pipe, fitting, and tank insulation, roofing material, floor sheeting, floor tile, wallboard
502	Dormitory	Floor tile, wallboard
504	Dormitory	Flexible duct/duct joint insulation, roofing material, floor tile
506	Dormitory	Wallboard, roofing material
508	Dormitory	Tank insulation, roofing material, wallboard, floor tile
510	Dormitory	Pipe and fitting insulation, roofing material, wallboard, floor tile
512	Dining Hall	Wallboard, floor tile
514	Dormitory	Pipe, fitting, tank, and equipment insulation, wallboard, roofing material, floor tile
1108	Storage and Supply	*No ACM identified*
1135	Swimmers Bath House	Roofing material
1600	Dormitory	Pipe, fitting, and tank insulation, wallboard, ceiling tile, roofing material, floor tile
1602	VOQ	Pipe, fitting, tank, and equipment insulation, roofing material, wallboard, floor tile
1608	Open Mess	Pipe, fitting, and tank insulation, wall plaster, ceiling plaster, floor tile, wallboard, ceiling tile, flexible duct/duct joint insulation, roofing material
1612	Officers Quarters	Wallboard, floor tile, roofing material
1700	Headquarters Group	Pipe and fitting insulation, floor material, wallboard, floor tile, roofing material

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Table H-1. Facilities Surveyed for Asbestos, Wurtsmith Air Force Base, 1992
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Location (Facility No.)	Facility Description	Asbestos-Containing Material Present
1702	Headquarters Wing	Pipe and fitting insulation, wall transite, floor tile, wallboard, roofing material
1810	Headquarters Group	Fitting, tank, and equipment insulation, ceiling tile, wallboard, floor tile, roofing material
1842	Composite Medical	Pipe, fitting, and tank insulation, duct insulation, floor material, floor tile, wallboard, ceiling tile, roofing material
1843	Material Services	No ACM identified
1950	Open Mess	Pipe, fitting, tank, and equipment insulation, ceiling plaster, ceiling tile, floor tile, wallboard, roofing material
3000	Waste Treatment Building	No ACM identified
3001	Waste Treatment Building	Ceiling tile, roofing material
3002	Waste Treatment Building	Floor tile, flexible duct/duct joint insulation, ceiling tile, roofing material
3010	Animal Clinic	Ceiling tile, floor tile, wallboard, roofing material
3020	Locomotive Shelter	Wallboard, roofing material
3025	Hazardous Storage	Roofing material
3027	Cold Storage	Pipe fitting, insulation, floor tile, roofing material, ceiling coating
3029	Warehouse Supply and Equipment	Pipe, fitting, and equipment insulation, floor tile, ceiling tile, wallboard, roofing material
4004	Headquarters Wing	Wall transite, wallboard, floor tile
5001	Hazardous Storage	Roofing material
5002	Communication Transmitter	Flexible duct/duct joint insulation, wallboard, floor tile, roofing material

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Table H-1. Facilities Surveyed for Asbestos, Wurtsmith Air Force Base, 1992
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Location (Facility No.)	Facility Description	Asbestos-Containing Material Present
5003	RAPCON Center	Flexible duct/duct joint insulation, wall transite, ceiling transite, floor tile, ceiling tile, wallboard, roofing material
5006	Headquarters Wing	Duct insulation, flexible duct/duct joint insulation, pipe and fitting insulation, floor tile, ceiling tile, wallboard, ceiling plaster, roofing material
5008	Aircraft Shop	Pipe and fitting insulation, flexible duct/duct joint insulation, floor tile, wallboard, ceiling tile, duct insulation, roofing material
5009	Storage Facility	Fitting and equipment storage, wallboard, floor tile, ceiling tile
5036	ILS Glide Slope	Floor tile
5037	ILS Glide Slope	No ACM identified
5038	ILS Localizer	Floor tile
5040	ILS Marker Beacon	Wallboard
5041	ILS Marker Beacon	Wallboard
5045	Weapons and Release Systems Shop	Fitting insulation, ceiling tile, floor tile
5046	RAPCON Center	Pipe, fitting, and equipment insulation, duct insulation, floor tile, ceiling tile, wallboard, roofing material
5052	VORTAC	No ACM identified
5054	Electric Generator Station	Wallboard, roofing material
5060	Maintenance Dock	Pipe and fitting insulation, flexible duct/duct joint insulation, ceiling tile, floor tile, wallboard
5061	Maintenance Dock	Pipe, fitting, and equipment insulation, floor tile, ceiling tile, wallboard

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Table H-1. Facilities Surveyed for Asbestos, Wurtsmith Air Force Base, 1992
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Location (Facility No.)	Facility Description	Asbestos-Containing Material Present
5062	Maintenance Dock	Pipe, fitting, and equipment insulation, duct insulation, flexible duct/duct joint insulation, floor tile, ceiling tile
5065	Squadron Operations	Duct insulation, pipe and fitting insulation, flexible duct/duct joint insulation, wallboard, ceiling tile, floor tile, roofing material
5066	Aircraft Corrosion Control	Flexible duct/duct joint insulation, fitting and equipment insulation, floor tile
5067	Maintenance Dock	Pipe and fitting insulation, flexible duct/duct joint insulation, ceiling tile floor tile, wallboard
5068	Maintenance Dock	Pipe and fitting insulation, flexible duct/duct joint insulation, wallboard, floor tile, ceiling tile
5070	Squadron Operations	Fitting insulation, wallboard, ceiling tile, floor tile roofing material
5071	Squadron Operations	Wallboard, floor tile, ceiling tile, roofing material
5073	Fuel Hydrant Building	Floor tile, roofing material, flexible duct/duct joint insulation
5075	Fuel Hydrant Building	Floor tile, roofing material, flexible duct/duct joint insulation
5076	Water Pump Station	Roofing material
5079	Utility Vault	Roofing material
5081	Vehicle Fueling Station	Floor tile, roofing material
5083	Utility Vault	Roofing material
5090	Vehicle Operations Parking	Pipe, fitting, tank, and equipment insulation, wall transite, ceiling tile, floor tile, wallboard
5091	Fire Station	Pipe, fitting, and equipment insulation, floor tile, ceiling tile, roofing material

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Table H-1. Facilities Surveyed for Asbestos, Wurtsmith Air Force Base, 1992
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Location (Facility No.)	Facility Description	Asbestos-Containing Material Present
5095	Control Tower	Floor tile, pipe fitting insulation, wall plaster, ceiling plaster
5096	Petroleum Operation Building	Ceiling tile, floor tile, wallboard, pipe fitting insulation
5098	High-bay Technical Training	Wallboard, floor tile
5100	Storage Igloo	No ACM identified
5102	Storage Igloo	No ACM identified
5104	Storage Igloo	No ACM identified
5106	Storage Igloo	No ACM identified
5107	Storage Igloo	No ACM identified
5108	Storage Igloo	No ACM identified
5109	Survival Inspection Shop	Ceiling tile, floor tile, wallboard, roofing material
5110	Liquid Oxygen Storage	No ACM identified
5111	Liquid Oxygen Storage	Ceiling tile, wallboard
5328	Spare Inert Storage	Pipe fitting insulation, floor tile, ceiling tile
5330	Munition Cubicle	Roofing material
5332	Munition Cubicle	Roofing material
5333	Segmented Magazine	No ACM identified
5334	Munitions Maintenance Administration	Pipe fitting and tank insulation, duct, insulation, floor tile, ceiling tile, wallboard, roofing material
5335	Conventional Munitions Shop	Pipe fitting insulation, wallboard, ceiling tile, floor tile, roofing material
5336	Security Police Entry Control	Pipe, fitting, and tank insulation, duct insulation, flexible duct/duct joint insulation, wallboard, ceiling tile, floor tile, roofing material
5340	Readiness Crew	Ceiling tile, wallboard, roofing material

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Table H-1. Facilities Surveyed for Asbestos, Wurtsmith Air Force Base, 1992
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Location (Facility No.)	Facility Description	Asbestos-Containing Material Present
5350	Readiness Crew	Floor tile, ceiling tile, roofing material
5356	Security Police Entry Control	Floor tile, roofing material
5600	Warehouse Supply and Equipment	Wallboard, equipment gasket
5602	Warehouse Supply and Equipment	No ACM identified
5606	Administration Office	Pipe fitting insulation, wallboard, floor tile
5608	Warehouse Supply and Equipment	No ACM identified
5610	Warehouse Supply and Equipment	No ACM identified
5613	Canine Kennel	Floor tile, ceiling tile, wallboard
7295	Squadron Operations	Roofing material, ceiling tile
8252	Youth Center	Pipe fitting insulation, ceiling tile, floor tile, roofing material
8254	Child Care Center	Floor tile, ceiling tile, flexible duct/duct joint insulation, wallboard, roofing material
8260	*Family Housing Management*	Ceiling tile, wallboard, floor tile, roofing material
8950	Security Police Central Control	Floor tile, wallboard, roofing material
9421	Maintenance Shop	Wallboard, floor tile, roofing material
9422	Maintenance Shop	Roofing material
9423	Youth Center	Floor tile, wallboard, roofing material

Notes: The asbestos survey included representative samples taken from family housing structures with ACM being identified in wallboard, floor tile, and roofing materials.
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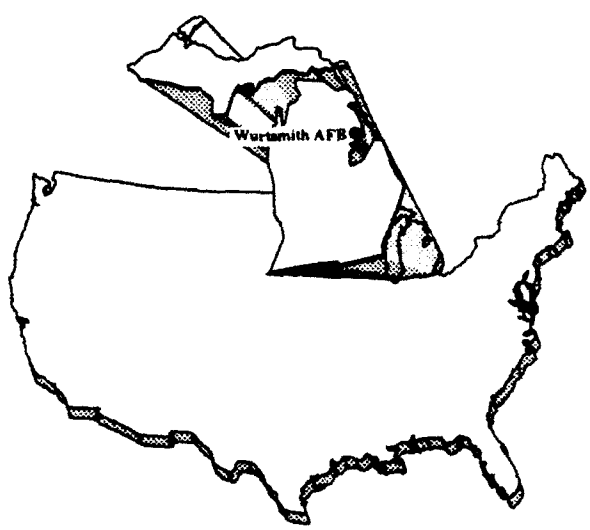


APPENDIX I

APPENDIX I

PLANT AND ANIMAL SPECIES OCCURRING ON OR NEAR WURTSMITH AIR FORCE BASE

Table I-1. Vegetation and Wildlife Species Occurring on or near Wurtsmith Air Force Base

Common Name	Scientific Name
Vegetation	
Trees	
Silver maple	*Acer saccharinum*
Alder	*Alnus serrulata*
Serviceberry	*Amelanchier* sp.
Paper birch	*Betula papyrifera*
Silky dogwood	*Cornus obliqua*
Tamarack	*Larix laricina*
Black spruce	*Picea mariana*
Jack pine	*Pinus banksiana*
Northern or red pine	*Pinus resinosa*
Bigtooth aspen	*Populus grandidentata*
Northern red oak	*Quercus rubra*
Willow	*Salix* sp.
Northern white cedar	*Thuja occidentalis*
Herbs and shrubs	
Spreading dogbane	*Apocynum androsaemifolium*
Lady fern	*Athyrium filix-femina*
Pitcher's thistle	*Cirsium pitcheri*
Sweet fern	*Comptonia peregrina*
Bunchberry	*Cornus canadensis*
Orchard grass	*Dactylis glomerata*
Bush honeysuckle	*Diervilla lonicera*
Meadow fescue	*Festuca elatior*
Labrador tea	*Ledum groenlandicum*
Sensitive fern	*Onoclea sensibilis*
Flowering or royal fern	*Osmunda regalis*
Bracken fern	*Pteridium aquilinum*
Staghorn sumac	*Rhus typhina*

Table I-1. Vegetation and Wildlife Species Occurring on or near Wurtsmith Air Force Base
Page 2 of 4

Common Name	Scientific Name
Vegetation (continued)	
Herbs and Shrubs	
Swamp dewberry	*Rubus hispidus*
Moss	*Sphagnum* sp.
Skunk cabbage	*Symplocarpus foetidus*
Starflower	*Trientalis borealis*
Cattail	*Typha* sp.
Late low blueberry	*Vaccinium angustifolium*
Barren strawberry	*Waldsteinia fragarioides*
Wild rice	*Zizania aquatica var. aquatica*
Wildlife	
Mammals	
Coyote	*Canis latrans*
Beaver	*Castor canadensis*
Virginia opossum	*Didelphis virginiana*
Northern flying squirrel	*Glaucomys sabrinus*
Snowshoe hare	*Lepus americanus*
Woodchuck	*Marmota monax*
Striped skunk	*Mephitis mephitis*
Meadow vole	*Microtus pennsylvanicus*
House mouse	*Mus musculus*
Long-tailed weasel	*Mustela frenata*
Mink	*Mustela vison*
Little brown bat	*Myotis lucifugus*
White-tailed deer	*Odocoileus virginianus*
Muskrat	*Ondatra zibethica*
Deer mouse	*Peromyscus maniculatus*
White-footed mouse	*Peromyscus leucopus*
American woodcock	*Philophela minor*
Raccoon	*Procyon lotor*

Table I-1. Vegetation and Wildlife Species Occurring on or near Wurtsmith Air Force Base
Page 3 of 4

Common Name	Scientific Name
Wildlife (continued)	
Mammals	
Gray squirrel	*Sciurus carolinensis*
Fox squirrel	*Sciurus niger*
Masked shrew	*Sorex cinereus*
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*
Eastern cottontail	*Sylvilagus floridanus*
Eastern chipmunk	*Tamias striatus*
Badger	*Taxidea taxus*
Gray fox	*Urocyon cinereoargenteus*
Birds	
Sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
Northern saw-whet owl	*Aegolius acadicus*
Wood duck	*Aix sponsa*
Green-winged teal	*Anas crecca*
Mallard	*Anas platyrhynchos*
Canvasback	*Aythya valisineria*
Ruffed grouse	*Bonasa umbellus*
Canada goose	*Branta canadensis*
Great horned owl	*Bubo virginianus*
Bufflehead	*Bucephala albeola*
Red-tailed hawk	*Buteo jamaicensis*
House finch	*Carpodacus mexicanus*
American crow	*Corvus brachyrhynchos*
Palm warbler	*Dendroica palmarum*
Chestnut-sided warbler	*Dendroica pensylvanica*
Pileated woodpecker	*Dryocopus pileatus*
American kestrel	*Falco sparverius*
American coot	*Fulica americana*

Table I-1. Vegetation and Wildlife Species Occurring on or near Wurtsmith Air Force Base
Page 4 of 4

Common Name	Scientific Name
Wildlife (continued)	
Birds	
Bald eagle	*Haliaeetus leucocephalus*
Ring-billed gull	*Larus delawarensis*
Belted kingfisher	*Megaceryle alcyon*
Wild turkey	*Meleagris gallopavo*
Lincoln's sparrow	*Melospiza lincolnii*
Song sparrow	*Melospiza melodia*
Tufted titmouse	*Parus bicolor*
Black-capped chickadee	*Parus atricapillus*
House sparrow	*Passer domesticus*
American woodcock	*Philohela minor*
Scarlet tanager	*Piranga olivacea*
Eastern bluebird	*Sialia sialis*
Red-breasted nuthatch	*Sitta canadensis*
American tree sparrow	*Spizella arborea*
Field sparrow	*Spizella pusilla*
Barred owl	*Strix varia*
European starling	*Sturnus vulgaris*
American robin	*Turdus migratorius*

Table I-2. Threatened, Endangered, and Candidate Species Potentially Occurring in the Vicinity of Wurtsmith Air Force Base
Page 1 of 2

Name	Status[a] Federal	State	Habitat and Distribution
Plants			
Dragon's mouth *(Arethusa bulbosa)*	-	SC	Occurs in bogs and swampy meadows. May occur on Wurtsmith AFB.
Hill's thistle *(Cirsium hillii)*	C2	SC	Inhabits prairies and other open places. unlikely to occur on base.
Lake cress *(Armoracia aquatica)*	C2	T	Inhabits quiet lakes and streams. Unlikely to occur on base but may occur slightly off base at Van Etten Lake or Au Sable River.
Least pinweed *(Lechea minor)*	-	SC	Occurs in sandy woods and around the edges of dry ponds. May occur at Wurtsmith AFB.
Pitcher's thistle *(Cirsium pitcheri)*	T	T	Inhabits dunes of Great Lakes. Unlikely to occur on base.
Ram's head	C3	SC	Occurs in moist usually sandy soils. May occur at Wurtsmith AFB.
Wild rice *(Zizania aquatica var. aquatica)*	-	T	Occurs in shallow waters and the edges of streams. May occur in wetlands on base.
Insects			
Lake Huron locust *(Trimerotropis huroniana)*	C2	PT	Occurs only on high quality, sparsely vegetated, coastal sand dunes. Not likely to occur at Wurtsmith AFB.
Secretive locust *(Appalachia arcana)*	C2	SC	Inhabits shrubby areas exposed to full sunlight at least part of the day. One recorded sighting in the large forested wetland in the northwest portion of Wurtsmith AFB.
Reptiles			
Massasaga (rattlesnake) *(Sistrurus catenatus)*	C2	SC	Inhabits swamps, bogs, and marshes. Occurs along the Au Sable River floodplain on base.
Wood turtle *(Clemmys insculpta)*	-	SC	Inhabits marshy meadows and cool streams in deciduous woodlands. Likely to occur in the forested wetland in the northwest portion of Wurtsmith AFB.

Table I-2. Threatened, Endangered, and Candidate Species Potentially Occurring in the Vicinity of Wurtsmith Air Force Base
Page 2 of 2

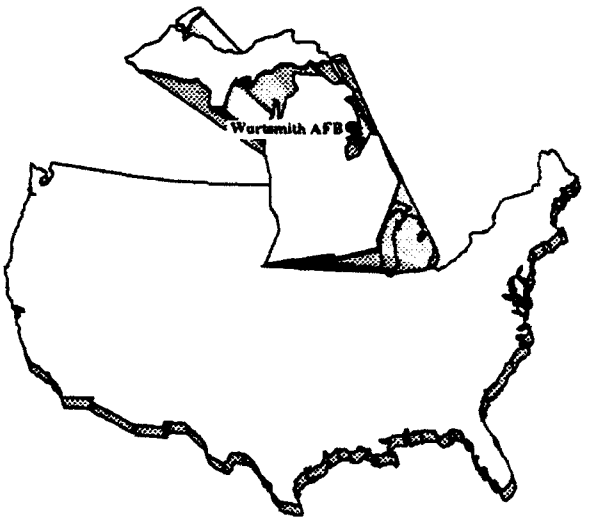
Name	Status[a] Federal	State	Habitat and Distribution
Birds			
Bald Eagle *(Haliaeetus leucucephalus)*	T	T	Nests along rivers and lakeshores around Wurtsmith AFB. Unlikely to occur on base due to lack of suitable habitat.
Kirtland's warbler *(Dendroica kirtlandii)*	E	E	Nests in fairly dense stands of young jack pines. A Kirtland's warbler recovery area is located 1 mile south of the base. Potentially occurs at Wurtsmith AFB in the jack pine stand west of Rea Road.
Fish			
Channel darter *(Percina copelandi)*	-	T	Occurs in lake Huron. Spawns in weakly flowing water over a gravel-bottom area. Recorded in 1986 from the Au Sable River below Foote Dam approximately 3 miles west of Wurtsmith AFB.
Lake Sturgeon *(Acipenser fulvescens)*	C2	T	Recorded in the Au Sable River south of Wurtsmith AFB. Possibly spawns in 1- to 5-meter deep fast-flowing water in the Au Sable River.
River darter *(Percina shumardi)*	-	T/PE	One 1925 locality record from the Au Sable River prior to the construction of Foote Dam. Possibly still occurs in the Au Sable River.

Notes: (a) Federal status determined by USFWS:

- E Endangered; in danger of extinction throughout all or a significant portion of its range.
- T Threatened; likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.
- C1 Substantial on-file information on biological vulnerability and threat indicates that proposing to list these species as endangered or threatened is appropriate.
- C2 Information indicates that proposing to list these species is possibly appropriate, though more data on vulnerability and threat is necessary.
- C3 Information indicates that these species have proven to be more abundant than previously believed and are not subject to any identifiable threat.
- \- Not listed.

State Status:

- E Listed as endangered by the state of Michigan.
- T Listed as threatened by the state of Michigan.
- PE Proposed for listing as endangered by the state of Michigan.
- PT Proposed for listing as threatened by the state of Michigan.
- SC Michigan Natural Features Inventory "Species of Special Concern" is defined as rare and may become endangered or threatened in the future.



APPENDIX J

APPENDIX J

NOISE

NOISE

1.0 DESCRIPTION OF PROPOSED ALTERNATIVES

1.1 PRECLOSURE

Typical noise sources on and around airfields usually include aircraft, surface traffic, and other human activities.

Military aircraft operations are the primary source of noise in the vicinity of Wurtsmith Air Force Base (AFB). The air operations and noise contours for preclosure are taken from the *Draft Environmental Impact Statement-Proposed Closure of Eaker AFB, Arkansas (with Wurtsmith Option)* (U.S. Air Force, 1990a). The contours for preclosure operations are shown in Figure 3.4-3 in the Affected Environment Chapter of this EIS. In airport analyses, areas with a Day-Night Average Sound Level (DNL) above 65 A-weighted decibels (dB) are considered in land use compatibility planning and impact assessment; therefore, the distances to areas with DNLs greater than 65 dB were of particular interest.

The baseline surface traffic noise levels in the vicinity of the base were established in terms of DNL by modeling the arterial roadways near the base using current traffic and speed characteristics. Peak month average daily traffic (ADT) data, traffic mix and day/night split were developed in the traffic engineering study presented in Section 3.2.3, Transportation, and were used to estimate preclosure noise levels. The traffic data used in the analysis are presented in Table J-1. The traffic mix was assumed to be 4 percent medium trucks and 2 percent heavy trucks. Eleven percent of the traffic was assumed to be nighttime traffic. The noise levels generated by surface traffic were predicted using the model published by the Federal Highway Administration (1978). The noise levels are estimated as a function of distance from the centerline of the nearest road.

1.2 CLOSURE BASELINE

At closure, it is assumed that there would be no aircraft activity. The noise levels projected for the closure baseline for surface traffic were calculated using the traffic projections at base closure. The ADTs used for the analysis are presented in Table J-1.

1.3 PROPOSED ACTION

The Proposed Action for the reuse of Wurtsmith AFB is a comprehensive reuse plan centered around a general aviation facility. Primary components of this plan include general aviation and maintenance/refurbishing operations.

Table J-1. Surface Traffic Operations for Total Traffic Volumes (Project and Non-Project)

Roadway	ADT	Speed Assumed (mph)	Road Width Assumed No. of Lanes
Preclosure			
U.S. 23 (Johnson Rd to River Rd)	22,440	25	2
U.S. 23 (River Rd to Cedar Lake Rd)	32,370	25	4
U.S. 23 (Cedar Lake Rd to F-41)	44,890	50	4
U.S. 23 (F-41 to Roadside Park)	18,780	50	2
U.S. 23 (Roadside Park to County Line)	10,690	50	2
F-41 (U.S. 23 to Skeel Ave)	22,535	25	4
F-41 (Skeel Ave to Rea Rd)	4,740	50	2
F-41 (Rea Rd to N. County Line)	2,790	50	2
Cedar Lake Rd (F-41 to Loud Rd)	8,530	25	2
Loud Rd (Cedar Lake Rd to Loud Island)	2,360	25	2
River Rd (D&M Railroad to Grass Lake Rd)	6,250	25	2
Rea Rd (River Rd to F-41)	1,430	40	2
Bissonette Rd (Rea Rd to Alvin Rd)	1,300	40	2
Closure			
U.S. 23 (Johnson Rd to River Rd)	17,863	25	2
U.S. 23 (River Rd to Cedar Lake Rd)	22,137	25	4
U.S. 23 (Cedar Lake Rd to F-41)	26,107	50	4
U.S. 23 (F-41 to Roadside Park)	15,267	50	2
U.S. 23 (Roadside Park to County Line)	9,466	50	2
F-41 (U.S. 23 to Skeel Ave)	7,328	25	4
F-41 (Cedar Lake Rd to Skeel Ave)	3,817	25	4
F-41 (Skeel Ave to Rea Rd)	3,206	50	2
F-41 (Rea Rd to N. County Line)	1,985	50	2
Cedar Lake Rd (F-41 to Loud Rd)	2,519	25	2
Loud Rd (Cedar Lake Rd to Loud Island)	773	25	2
River Rd (D&M Railroad to Grass Lake Rd)	2,137	25	2
Rea Rd (River Rd to F-41)	1,466	40	2
Bissonette Rd (Rea Rd to Alvin Rd)	1,344	40	2

D&M = Detroit and Mackinac

The fleet mix and annual aircraft operations for each of the modeled years are contained in Table J-2. The DNL contours for the proposed flight operations and the proposed flight tracks modeled are presented in Section 4.4.4, Noise. The day-night split for all aircraft operations is shown in Table J-3. Stage lengths for aircraft operations are given in Table J-4.

Engine runup operations were assumed to occur at an existing maintenance apron directly to the south of the eastern end of the runway, approximately 3,000 feet from the runway centerline. The number of runup operations is presented in Table J-5. During typical runup operations, the engines would run for 15 minutes at 75 percent power. It was assumed that no noise suppression facilities would be available. The aircraft were assumed to have a heading of 60 degrees.

General aviation operations were divided into four types:

- Single-engine (COMSEP) - A composite single-engine propeller plane was modeled.
- Multi-engine - Beech Baron 58P was assumed to be a typical multi-engine propeller plane.
- Turboprop - Cessna Conquest II was assumed to be a typical turboprop.
- Turbojet - Learjet 35 was assumed to be a typical turbojet.

The touch-and-go patterns and the initial departure and final approach flight tracks used in the modeling are shown in Figure J-1. The departure and arrival flight tracks used are simple straight-in/straight-out tracks. The flight tracks are primarily toward the northeast and southwest, following the headings of the runways. The touch-and-go flight tracks were based on those in common usage at similar sized airports. Touch-and-go operations were assumed to consist of 35 percent of all piston-engined general aviation operations and were split on four tracks (two for runway 06 and two for runway 24). The operations were then dispersed 25 percent on runway 06 and 75 percent on runway 24. Daily operations assigned to each flight track and time period for the Proposed Action are provided in Table J-6 for each of the study years.

A standard 3-degree glide slope and the takeoff profiles provided by the Federal Aviation Administration's (FAA) Integrated Noise Model (INM) Database 3.10 were assumed for all aircraft.

Surface traffic data used in the modeling were developed from the project traffic study presented in Section, 4.2.3, Transportation, and are shown in Table J-7. Surface traffic sound levels are presented in Tables J-8 through J-11. These levels are presented in terms of DNL as a function of distance from the centerline of the roadways analyzed.

TABLE J-2a
SCENARIO: Proposed Action
MODELED YEAR: 1998

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Manufacturing/Refurbishing			1,344	8
B-727-100	48	4		
B-727-200	288	21		
B-747-200	144	11		
DC-9-30	72	5		
DC-8-50	192	14		
MU-2	72	5		
Learjet 35	240	18		
Beech King Air	288	21		
General Aviation			15,300	92
COMSEP (composite single-engine piston)	13,770	90		
Beech Baron 58P (twin engine piston)	1,070	7		
Cessna Conquest II (turboprop)	150	1		
Learjet 35 (corporate jet)	310	2		
TOTAL			16,644	100

TABLE J-2b
SCENARIO: Proposed Action
MODELED YEAR: 2003

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Manufacturing/Refurbishing			1,392	7
B-727-100 (re-engined)	0	0		
B-727-200 (re-engined)	288	21		
B-747-400	216	16		
MD-81	72	5		
DC-8-70	144	10		
MU-2	96	7		
Learjet 35	240	17		
Beech King Air	336	24		
General Aviation			17,400	93
COMSEP (composite single engine piston)	15,660	90		
Beech Baron 58P (twin engine piston)	1,220	7		
Cessna Conquest II (turboprop)	170	1		
Learjet 35 (corporate jet)	350	2		
TOTAL			18,792	100

TABLE J-2c
SCENARIO: Proposed Action
MODELED YEAR: 2013

Type of Aircraft	Number of Operations	Percent of Category	Total for Category	Category Percent of Total
Manufacturing/Refurbishing			1,440	6
B-727-100 (re-engined)	0	0		
B-727-200 (re-engined)	192	13		
B-747-400	336	23		
MD-81	0	0		
DC-8-70	96	7		
MU-2	192	13		
Learjet 35	240	17		
Beech King Air	384	27		
General Aviation			21,190	94
COMSEP (composite single engine piston)	18,870	89		
Beech Baron 58P (twin engine piston)	1,480	7		
Cessna Conquest II (turboprop)	420	2		
Learjet 35 (corporate jet)	420	2		
TOTAL			22,630	100

Table J-3. Day-Night Split of Aircraft Operations for Proposed Action

Aircraft Type	Percent Daytime	Percent Nighttime
Maintenance/Refurbishing	90	10
General Aviation	90	10

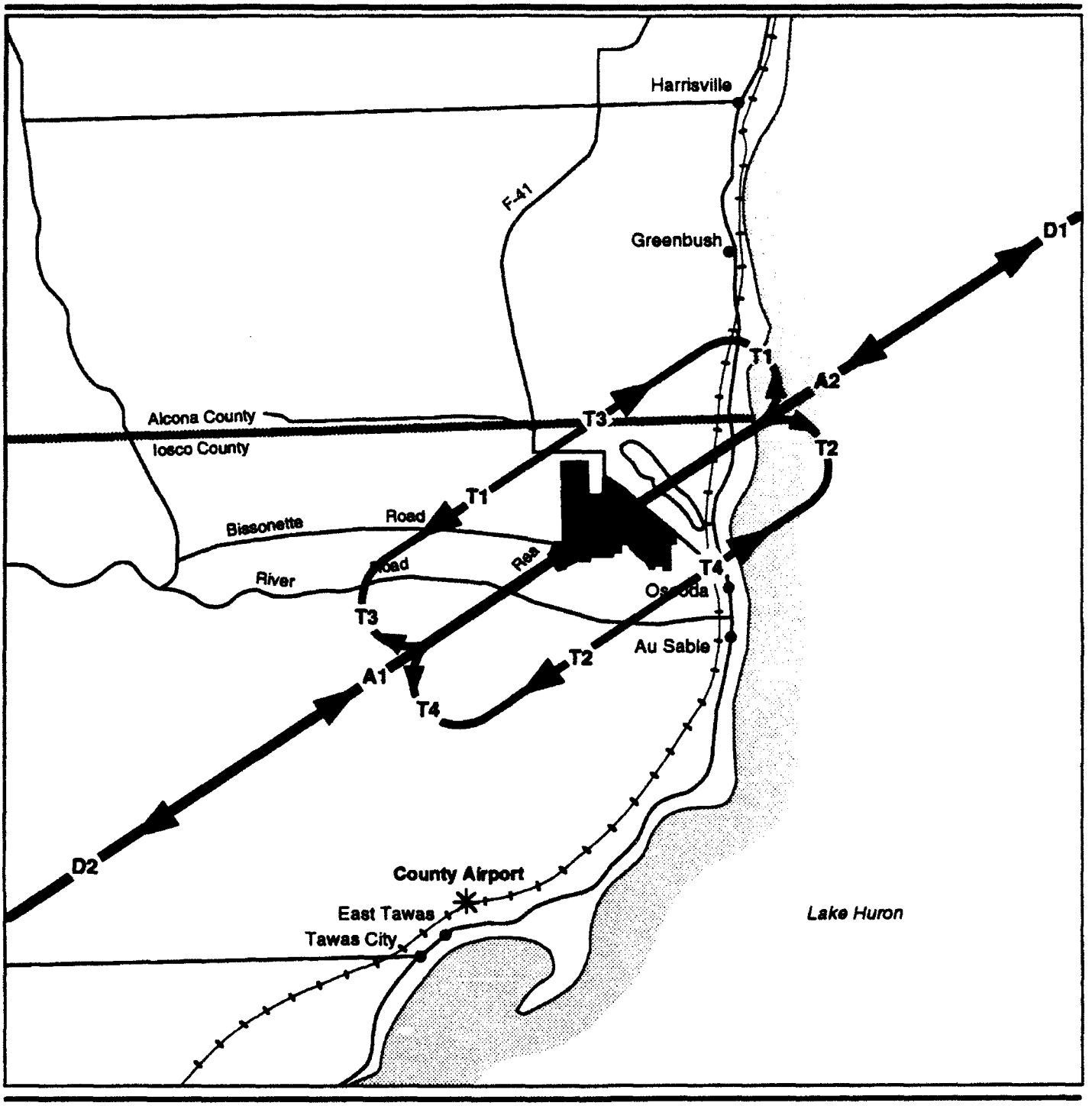
Table J-4. Stage Lengths[a] Assumed for Aircraft Operations for Proposed Action

Group	1998	2003	2013
Maintenance/Refurbishing	1	1	1
General Aviation	1	1	1

Note: (a) Stage length may affect operational parameters such as takeoff or landing profiles, engine thrust settings, and aircraft speed of some aircraft; these parameters may, in turn, affect aircraft noise exposure. Stage lengths correspond to the distance flown in increments of 500 miles (e.g., stage length 1 corresponds to flights between 1 and 500 miles; 2 corresponds to flights between 500 and 1,000 miles, etc.) The maximum stage length used in modeling is 7 (>4,500 miles).

Table J-5. Number of Daily Engine Runup Operations for the Proposed Action

	1998	2003	2013
B-727-100	.066	-	-
B-727-200	.395	-	-
B-747-200	.197	-	-
DC-9-30	.099	-	-
DC-8-30	.263	-	-
Mitsubishi MU-2	.099	.132	.263
Learjet 35	.329	.329	.329
Beech King Air	.395	.460	.526
B-727-200 (re-engined)	-	.395	.263
B-747-400	-	.296	.460
MD-81	-	.099	-
DC-8-70	-	.197	.132



EXPLANATION

- A — Arriving Flight Track
- D — Departing Flight Track
- T — Touch and Go Flight Track

0 6000 12000 24000 Feet

Primary Flight Tracks - Proposed Action

Figure J-1

Table J-6a. Assignment of Operations for the Proposed Action
Modeled Year: 1998

Aircraft	Arrival Flight Tracks				Departure Flight Tracks				Closed Pattern Flight Tracks							
	A1		A2		D1		D2		T1		T2		T3		T4	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-727-100	0.018	0.002	0.045	0.005	0.018	0.002	0.045	0.005	-	-	-	-	-	-	-	-
B-727-200	0.09	0.01	0.27	0.03	0.09	0.01	0.27	0.03	-	-	-	-	-	-	-	-
B-747-200	0.045	0.005	0.135	0.015	0.045	0.005	0.135	0.015	-	-	-	-	-	-	-	-
DC-9-30	0.018	0.002	0.063	0.007	0.018	0.002	0.063	0.007	-	-	-	-	-	-	-	-
DC-8-50	0.063	0.007	0.18	0.02	0.063	0.007	0.18	0.02	-	-	-	-	-	-	-	-
Mitsubishi MU-2	0.018	0.002	0.063	0.007	0.018	0.002	0.063	0.007	-	-	-	-	-	-	-	-
Learjet 35	0.072	0.008	0.225	0.025	0.072	0.008	0.225	0.025	-	-	-	-	-	-	-	-
Cessna Conquest II	0.09	0.01	0.27	0.03	0.09	0.01	0.27	0.03	-	-	-	-	-	-	-	-
COMSEP	2.61	0.46	7.82	1.38	2.61	0.46	7.82	1.38	-	-	-	-	-	-	-	-
Beech Baron 58P	0.20	0.04	0.61	0.11	0.20	0.04	0.61	0.11	-	-	-	-	-	-	-	-
Cessna Conquest II	0.04	0.01	0.13	0.02	0.04	0.01	0.13	0.02	-	-	-	-	-	-	-	-
Learjet 35	0.09	0.02	0.27	0.05	0.09	0.02	0.27	0.05	-	-	-	-	-	-	-	-
COMSEP	-	-	-	-	-	-	-	-	1.66	-	1.66	-	4.96	-	4.96	-
Beech Baron 58P	-	-	-	-	-	-	-	-	0.12	-	0.12	-	0.38	-	0.38	-
Total	3.354	0.576	10.081	1.699	3.354	0.576	10.081	1.699	1.78	-	1.78	-	5.34	-	5.34	-

Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table J-6b. Assignment of Operations for the Proposed Action
Modeled Year: 2003

Aircraft	Arrival Flight Tracks				Departure Flight Tracks				Closed Pattern Flight Tracks							
	A1		A2		D1		D2		T1		T2		T3		T4	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-727-200	0.09	0.01	0.27	0.03	0.09	0.01	0.27	0.03	-	-	-	-	-	-	-	-
B-747-400	0.063	0.007	0.198	0.022	0.063	0.007	0.198	0.022	-	-	-	-	-	-	-	-
MD-81	0.018	0.002	0.063	0.007	0.018	0.002	0.063	0.007	-	-	-	-	-	-	-	-
DC-8-70	0.045	0.005	0.135	0.015	0.045	0.005	0.135	0.015	-	-	-	-	-	-	-	-
Mitsubishi MU-2	0.027	0.003	0.09	0.01	0.027	0.003	0.09	0.01	-	-	-	-	-	-	-	-
Learjet 35	0.072	0.008	0.225	0.025	0.072	0.008	0.225	0.025	-	-	-	-	-	-	-	-
Cessna Conquest II	0.108	0.012	0.315	0.035	0.108	0.012	0.315	0.035	-	-	-	-	-	-	-	-
COMSEP	2.96	0.52	8.89	1.57	2.96	0.52	8.89	1.57	-	-	-	-	-	-	-	-
Beech Baron 58P	0.23	0.04	0.69	0.12	0.23	0.04	0.69	0.12	-	-	-	-	-	-	-	-
Cessna Conquest II	0.05	0.01	0.15	0.03	0.05	0.01	0.15	0.03	-	-	-	-	-	-	-	-
Learjet 35	0.10	0.02	0.30	0.05	0.10	0.02	0.30	0.05	-	-	-	-	-	-	-	-
COMSEP	-	-	-	-	-	-	-	-	1.88	-	1.88	-	5.64	-	5.64	-
Beech Baron 58P	-	-	-	-	-	-	-	-	0.14	-	0.14	-	0.44	-	0.44	-
Total	3.763	0.637	11.326	1.914	3.763	0.637	11.326	1.914	2.02	-	2.02	-	6.08	-	6.08	-

Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table J-6c. Assignment of Operations for the Proposed Action
Modeled Year: 2013

Aircraft	Arrival Flight Tracks				Departure Flight Tracks				Closed Pattern Flight Tracks							
	A1		A2		D1		D2		T1		T2		T3		T4	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
B-727-200	0.063	0.007	0.18	0.02	0.063	0.007	0.18	0.02	-	-	-	-	-	-	-	-
B-747-400	0.108	0.012	0.315	0.035	0.108	0.012	0.315	0.035	-	-	-	-	-	-	-	-
DC-8-70	0.027	0.003	0.09	0.01	0.027	0.003	0.09	0.01	-	-	-	-	-	-	-	-
Mitsubishi MU-2	0.063	0.007	0.18	0.02	0.063	0.007	0.18	0.02	-	-	-	-	-	-	-	-
Learjet 35	0.072	0.008	0.225	0.025	0.072	0.008	0.225	0.025	-	-	-	-	-	-	-	-
Cessna Conquest II	0.117	0.013	0.351	0.039	0.117	0.013	0.351	0.039	-	-	-	-	-	-	-	-
COMSEP	3.57	0.63	10.71	1.89	3.57	0.63	10.71	1.89	-	-	-	-	-	-	-	-
Beech Baron 58P	0.28	0.05	0.84	0.15	0.28	0.05	0.84	0.15	-	-	-	-	-	-	-	-
Cessna Conquest II	0.12	0.02	0.36	0.06	0.12	0.02	0.36	0.06	-	-	-	-	-	-	-	-
Learjet 35	0.12	0.02	0.36	0.06	0.12	0.02	0.36	0.06	-	-	-	-	-	-	-	-
COMSEP	-	-	-	-	-	-	-	-	2.26	-	2.26	-	6.78	-	6.78	-
Beech Baron 58P	-	-	-	-	-	-	-	-	0.18	-	0.18	-	0.54	-	0.54	-
Total	4.54	0.77	13.611	2.309	4.54	0.77	13.611	2.309	2.44	-	2.44	-	7.32	-	7.32	-

Day = 7:00 a.m. to 10:00 p.m.
Night = 10:00 p.m. to 7:00 a.m.

Table J-7. Surface Traffic Operations for Total Traffic Volumes (Project and Non-Project)

Alternative	1993		1998		2003		2013		Road Width Assumed (no. of lanes)
	ADT	Speed (mph)	ADT	Speed (mph)	ADT	Speed (mph)	ADT	Speed (mph)	
Proposed Action									
U.S. 23 (Johnson Rd. to River Rd.)	17,900	25	21,290	25	24,350	25	28,640	25	2
U.S. 23 (River Rd. to Cedar Lake Rd.)	22,250	25	28,530	25	32,260	25	38,740	25	4
U.S. 23 (Cedar Lake Rd. to F-41)	26,260	50	33,910	50	39,360	50	45,360	50	4
U.S. 23 (F-41 to Roadside Park)	15,310	50	18,390	50	21,110	50	24,820	50	2
U.S. 23 (Roadside Park to County Line)	9,480	50	11,450	50	13,290	50	15,900	50	2
F-41 (U.S. 23 to Skeel Ave.)	7,520	25	14,480	25	18,350	25	20,770	25	4
F-41 (Skeel Ave. to Rea Rd.)	3,400	50	10,150	50	13,800	50	15,740	50	2
F-41 (Rea Rd. to N. County Line)	3,280	50	6,080	50	7,650	50	8,640	50	2
Cedar Lake Rd. (F-41 to Loud Rd.)	2,630	25	6,720	25	8,940	25	10,170	25	2
Loud Rd. (Cedar Lake Rd. to Loud Island)	830	25	2,850	25	3,930	25	4,490	25	2
River Rd. (Detroit and Mackinac Railroad to Grass Lake Rd.)	2,200	25	4,280	25	5,440	25	6,160	25	2
Rea Rd. (River Rd. to F-41)	1,480	40	220	40	2,640	40	2,970	40	2
Bissonette Rd. (Rea Rd. to Alvin Rd.)	1,360	40	2,090	40	2,510	40	2,820	40	2
Fire Training									
U.S. 23 (Johnson Rd. to River Rd.)	17,890	25	21,290	25	24,050	25	28,360	25	2
U.S. 23 (River Rd. to Cedar Lake Rd.)	22,210	25	28,520	25	32,370	25	37,910	25	4
U.S. 23 (Cedar Lake Rd. to F-41)	26,210	50	33,900	50	38,170	50	44,250	50	4
U.S. 23 (F-41 to Roadside Park)	15,290	50	18,390	50	20,810	50	24,650	50	2
U.S. 23 (Roadside Park to County Line)	9,480	50	11,440	50	13,150	50	15,760	50	2
F-41 (U.S. 23 to Skeel Ave.)	7,460	25	14,470	25	16,870	25	19,390	25	4
F-41 (Skeel Ave. to Rea Rd.)	3,330	50	10,130	50	12,320	50	14,360	50	2
F-41 (Rea Rd. to N. County Line)	3,260	50	6,080	50	7,050	50	8,090	50	2
Cedar Lake Rd. (F-41 to Loud Rd.)	2,600	25	6,710	25	8,050	25	9,340	25	2
Loud Rd. (Cedar Lake Rd. to Loud Island)	810	25	2,840	25	3,490	25	4,080	25	2
River Rd. (Detroit and Mackinac Railroad to Grass Lake Rd.)	2,180	25	4,280	25	4,990	25	5,740	25	2
Rea Rd. (River Rd. to F-41)	1,480	40	2,220	40	2,500	40	2,830	40	2
Bissonette Rd. (Rea Rd. to Alvin Rd.)	1,360	40	2,090	40	2,360	40	2,680	40	2

Table J-7. Surface Traffic Operations for Total Traffic Volumes (Project and Non-Project)

Alternative	1993		1998		2003		2013		Road Width Assumed (no. of lanes)
	ADT	Speed (mph)	ADT	Speed (mph)	ADT	Speed (mph)	ADT	Speed (mph)	
Recreation									
U.S. 23 (Johnson Rd. to River Rd.)	17,890	25	21,010	25	23,710	25	28,060	25	2
U.S. 23 (River Rd. to Cedar Lake Rd.)	22,210	25	27,700	25	31,340	25	36,990	25	4
U.S. 23 (Cedar Lake Rd. to F-41)	26,210	50	32,800	50	36,800	50	43,020	50	4
U.S. 23 (F-41 to Roadside Park)	15,290	50	18,120	50	20,470	50	24,240	50	2
U.S. 23 (Roadside Park to County Line)	9,480	50	1,131	50	12,970	50	15,610	50	2
F-41 (U.S. 23 to Skeel Ave.)	7,450	25	13,100	25	15,150	25	17,850	25	4
F-41 (Skeel Ave. to Rea Rd.)	3,330	50	8,760	50	10,600	50	12,820	50	2
F-41 (Rea Rd. to N. County Line)	2,030	50	4,240	50	5,020	50	5,990	50	2
Cedar Lake Rd. (F-41 to Loud Rd.)	2,590	25	5,880	25	7,020	25	8,420	25	2
Loud Rd. (Cedar Lake Rd. to Loud Island)	810	25	2,430	25	2,970	25	3,620	25	2
River Rd. (Detroit and Mackinac Railroad to Grass Lake Rd.)	2,170	25	3,860	25	4,480	25	5,280	25	2
Rea Rd. (River Rd. to F-41)	1,480	40	2,080	40	2,320	40	2,680	40	2
Bissonette Rd. (Rea Rd. to Alvin Rd.)	1,360	40	1,950	40	2,190	40	2,530	40	2
No-Action									
U.S. 23 (Johnson Rd. to River Rd.)	17,860	25	19,930	25	22,300	25	26,280	25	2
U.S. 23 (River Rd. to Cedar Lake Rd.)	22,140	25	24,460	25	27,100	25	31,640	25	4
U.S. 23 (Cedar Lake Rd. to F-41)	26,110	50	28,480	50	31,150	50	35,890	50	4
U.S. 23 (F-41 to Roadside Park)	15,270	50	17,040	50	19,060	50	22,460	50	2
U.S. 23 (Roadside Park to County Line)	9,470	50	10,770	50	12,270	50	14,720	50	2
F-41 (U.S. 23 to Skeel Ave.)	7,330	25	7,700	25	8,090	25	8,940	25	4
F-41 (Skeel Ave. to Rea Rd.)	3,210	50	3,370	50	3,540	50	3,910	50	2
F-41 (Rea Rd. to N. County Line)	3,210	50	3,370	50	3,540	50	3,910	50	2
Cedar Lake Rd. (F-41 to Loud Rd.)	2,520	25	2,650	25	2,780	25	3,070	25	2
Loud Rd. (Cedar Lake Rd. to Loud Island)	770	25	810	25	850	25	940	25	2
River Rd. (Detroit and Mackinac Railroad to Grass Lake Rd.)	2,140	25	2,250	25	2,360	25	2,610	25	2
Rea Rd. (River Rd. to F-41)	1,470	40	1,540	40	1,620	40	1,790	40	2
Bissonette Rd. (Rea Rd. to Alvin Rd.)	1,340	40	1,410	40	1,480	40	1,640	40	2

Table J-8. Distance to DNL from Roadway Centerline for the Proposed Action
Page 1 of 2

Roadway	From/To	Distance (ft) DNL 65dB	Number of Residents	Distance (ft) DNL 70dB	Number of Residents	Distance (ft) DNL 75dB	Number of Residents
1993							
U.S. 23	Johnson Rd. to River Rd.	70	9	40	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	90	0	40	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	180	122	90	23	40	0
U.S. 23	F-41 to Roadside Park	130	378	60	16	30	0
U.S. 23	Roadside Park to County Line	90	134	40	0	20	0
F-41	U.S. 23 to Skeel Ave.	40	0	30	0	(a)	0
F-41	Skeel Ave. to Rea Rd.	50	0	20	0	(a)	0
F-41	Rea Rd. to N County Line	50	0	20	0	(a)	0
Cedar Lake Rd.	F-41 to Loud Rd.	20	0	(a)	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	(a)	0	(a)	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	20	0	(a)	0	(a)	0
Rea Rd.	River Rd. to F-41	20	0	(a)	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	20	0	(a)	0	(a)	0
1998							
U.S. 23	Johnson Rd. to River Rd.	80	15	40	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	100	0	50	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	210	155	100	34	50	0
U.S. 23	F-41 to Roadside Park	150	482	70	67	30	0
U.S. 23	Roadside Park to County Line	110	214	50	0	20	0
F-41	U.S. 23 to Skeel Ave.	70	1	40	0	30	0
F-41	Skeel Ave. to Rea Rd.	100	0	50	0	20	0
F-41	Rea Rd. to N County Line	70	9	30	0	20	0
Cedar Lake Rd.	F-41 to Loud Rd.	40	0	20	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	20	0	(a)	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	30	0	20	0	(a)	0
Rea Rd.	River Rd. to F-41	30	0	20	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	30	0	(a)	0	(a)	0

Note: (a) Contained within roadway.

Table J-8. Distance to DNL from Roadway Centerline for the Proposed Action
Page 2 of 2

Roadway	From/To	Distance (ft) DNL 65dB	Number of Residents	Distance (ft) DNL 70dB	Number of Residents	Distance (ft) DNL 75dB	Number of Residents
2003							
U.S. 23	Johnson Rd. to River Rd.	90	22	40	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	110	0	60	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	230	177	110	45	60	0
U.S. 23	F-41 to Roadside Park	160	534	70	67	40	0
U.S. 23	Roadside Park to County Line	120	255	60	12	30	0
F-41	U.S. 23 to Skeel Ave.	80	13	40	0	30	0
F-41	Skeel Ave. to Rea Rd.	120	1	60	0	30	0
F-41	Rea Rd. to N County Line	80	15	40	0	20	0
Cedar Lake Rd.	F-41 to Loud Rd.	50	0	20	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	30	0	20	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	30	0	20	0	(a)	0
Rea Rd.	River Rd. to F-41	30	0	20	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	30	0	20	0	(a)	0
2013							
U.S. 23	Johnson Rd. to River Rd.	100	28	50	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	120	0	60	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	260	210	120	56	60	0
U.S. 23	F-41 to Roadside Park	180	637	80	119	40	0
U.S. 23	Roadside Park to County Line	130	295	60	12	30	0
F-41	U.S. 23 to Skeel Ave.	90	25	50	0	30	0
F-41	Skeel Ave. to Rea Rd.	130	0	60	0	30	0
F-41	Rea Rd. to N County Line	90	22	40	0	20	0
Cedar Lake Rd.	F-41 to Loud Rd.	50	0	30	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	30	0	20	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	40	0	20	0	(a)	0
Rea Rd.	River Rd. to F-41	30	0	20	0	(a)	C
Bissonette Rd.	Rea Rd. to Alvin Rd.	30	0	20	0	(a)	0

Note: (a) Contained within roadway.

Table J-9. Distance to DNL from Roadway Centerline for the Fire Training Alternative
Page 1 of 2

Roadway	From/To	Distance (ft) DNL 65dB	Number of Residents	Distance (ft) DNL 70dB	Number of Residents	Distance (ft) DNL 75dB	Number of Residents
1993							
U.S. 23	Johnson Rd. to River Rd.	70	9	40	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	90	0	40	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	180	122	90	23	40	0
U.S. 23	F-41 to Roadside Park	130	378	60	16	30	0
U.S. 23	Roadside Park to County Line	90	134	40	0	20	0
F-41	U.S. 23 to Skeel Ave.	30	0	(a)	0	(a)	0
F-41	Skeel Ave. to Rea Rd.	50	0	20	0	(a)	0
F-41	Rea Rd. to N County Line	50	0	20	0	(a)	0
Cedar Lake Rd.	F-41 to Loud Rd.	20	0	(a)	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	(a)	0	(a)	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	20	0	(a)	0	(a)	0
Rea Rd.	River Rd. to F-41	20	0	(a)	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	20	0	(a)	0	(a)	0
1998							
U.S. 23	Johnson Rd. to River Rd.	80	15	40	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	100	0	50	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	210	155	100	34	50	0
U.S. 23	F-41 to Roadside Park	150	482	70	67	30	0
U.S. 23	Roadside Park to County Line	110	214	50	0	20	0
F-41	U.S. 23 to Skeel Ave.	70	1	40	0	30	0
F-41	Skeel Ave. to Rea Rd.	100	0	50	0	20	0
F-41	Rea Rd. to N County Line	70	9	30	0	20	0
Cedar Lake Rd.	F-41 to Loud Rd.	40	0	20	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	20	0	(a)	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	30	0	20	0	(a)	0
Rea Rd.	River Rd. to F-41	30	0	20	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	30	0	(a)	0	(a)	0

Note: (a) Contained within roadway.

Table J-9. Distance to DNL from Roadway Centerline for the Fire Training Alternative
Page 2 of 2

Roadway	From/To	Distance (ft) DNL 65dB	Number of Residents	Distance (ft) DNL 70dB	Number of Residents	Distance (ft) DNL 75dB	Number of Residents
2003							
U.S. 23	Johnson Rd. to River Rd.	90	22	40	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	110	0	50	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	230	177	110	45	50	0
U.S. 23	F-41 to Roadside Park	160	534	70	67	40	0
U.S. 23	Roadside Park to County Line	120	255	50	0	30	0
F-41	U.S. 23 to Skeel Ave.	80	13	40	0	30	0
F-41	Skeel Ave. to Rea Rd.	110	0	50	0	30	0
F-41	Rea Rd. to N County Line	80	15	40	0	20	0
Cedar Lake Rd.	F-41 to Loud Rd.	40	0	20	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	30	0	20	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	30	0	20	0	(a)	0
Rea Rd.	River Rd. to F-41	30	0	20	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	30	0	20	0	(a)	0
2013							
U.S. 23	Johnson Rd. to River Rd.	100	28	50	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	120	0	60	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	250	199	120	56	60	0
U.S. 23	F-41 to Roadside Park	180	637	80	119	40	0
U.S. 23	Roadside Park to County Line	130	295	60	12	30	0
F-41	U.S. 23 to Skeel Ave.	90	25	40	0	30	0
F-41	Skeel Ave. to Rea Rd.	120	0	60	0	30	0
F-41	Rea Rd. to N County Line	80	15	40	0	20	0
Cedar Lake Rd.	F-41 to Loud Rd.	50	0	20	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	30	0	20	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	40	0	20	0	(a)	0
Rea Rd.	River Rd. to F-41	30	0	20	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	30	0	20	0	(a)	0

Note: (a) Contained within roadway.

Table J-10. Distance to DNL from Roadway Centerline for the Recreation Alternative
Page 1 of 2

Roadway	From/To	Distance (ft) DNL 65dB	Number of Residents	Distance (ft) DNL 70dB	Number of Residents	Distance (ft) DNL 75dB	Number of Residents
1993							
U.S. 23	Johnson Rd. to River Rd.	70	9	40	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	90	0	40	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	180	122	90	23	40	0
U.S. 23	F-41 to Roadside Park	130	378	60	16	30	0
U.S. 23	Roadside Park to County Line	90	134	40	0	20	0
F-41	U.S. 23 to Skeel Ave.	30	0	(a)	0	(a)	0
F-41	Skeel Ave. to Rea Rd.	50	0	20	0	(a)	0
F-41	Rea Rd. to N County Line	50	0	20	0	(a)	0
Cedar Lake Rd.	F-41 to Loud Rd.	20	0	(a)	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	(a)	0	(a)	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	20	0	(a)	0	(a)	0
Rea Rd.	River Rd. to F-41	20	0	(a)	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	20	0	(a)	0	(a)	0
1998							
U.S. 23	Johnson Rd. to River Rd.	80	15	40	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	100	0	50	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	210	155	100	34	50	0
U.S. 23	F-41 to Roadside Park	140	430	70	67	30	0
U.S. 23	Roadside Park to County Line	110	214	30	0	20	0
F-41	U.S. 23 to Skeel Ave.	60	0	30	0	30	0
F-41	Skeel Ave. to Rea Rd.	90	0	30	0	20	0
F-41	Rea Rd. to N County Line	60	2	30	0	20	0
Cedar Lake Rd.	F-41 to Loud Rd.	40	0	20	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	20	0	(a)	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	30	0	20	0	(a)	0
Rea Rd.	River Rd. to F-41	30	0	20	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	30	0	(a)	0	(a)	0

Note: (a) Contained within roadway.

Table J-10. Distance to DNL from Roadway Centerline for the Recreation Alternative
Page 2 of 2

Roadway	From/To	Distance (ft) DNL 65dB	Number of Residents	Distance (ft) DNL 70dB	Number of Residents	Distance (ft) DNL 75dB	Number of Residents
2003							
U.S. 23	Johnson Rd. to River Rd.	90	22	40	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	110	0	50	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	220	166	110	45	50	0
U.S. 23	F-41 to Roadside Park	160	534	70	67	40	0
U.S. 23	Roadside Park to County Line	120	255	50	0	30	0
F-41	U.S. 23 to Skeel Ave.	70	13	40	0	30	0
F-41	Skeel Ave. to Rea Rd.	110	0	50	0	30	0
F-41	Rea Rd. to N County Line	60	15	40	0	20	0
Cedar Lake Rd.	F-41 to Loud Rd.	40	0	20	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	20	0	20	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	30	0	20	0	(a)	0
Rea Rd.	River Rd. to F-41	30	0	20	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	30	0	20	0	(a)	0
2013							
U.S. 23	Johnson Rd. to River Rd.	100	28	50	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	120	0	60	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	250	199	120	56	60	0
U.S. 23	F-41 to Roadside Park	170	586	80	119	40	0
U.S. 23	Roadside Park to County Line	130	295	60	12	30	0
F-41	U.S. 23 to Skeel Ave.	80	13	40	0	30	0
F-41	Skeel Ave. to Rea Rd.	110	0	60	0	30	0
F-41	Rea Rd. to N County Line	70	9	40	0	20	0
Cedar Lake Rd.	F-41 to Loud Rd.	50	0	20	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	30	0	20	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	30	0	20	0	(a)	0
Rea Rd.	River Rd. to F-41	30	0	20	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	30	0	20	0	(a)	0

Note: (a) Contained within roadway.

Table J-11. Distance to DNL from Roadway Centerline for the No-Action Alternative
Page 1 of 2

Roadway	From/To	Distance (ft) DNL 65dB	Number of Residents	Distance (ft) DNL 70dB	Number of Residents	Distance (ft) DNL 75dB	Number of Residents
1993							
U.S. 23	Johnson Rd. to River Rd.	70	9	40	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	90	0	40	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	180	122	90	23	40	0
U.S. 23	F-41 to Roadside Park	130	378	60	16	30	0
U.S. 23	Roadside Park to County Line	90	134	40	0	20	0
F-41	U.S. 23 to Skeel Ave.	30	0	(a)	0	(a)	0
F-41	Skeel Ave. to Rea Rd.	50	0	20	0	(a)	0
F-41	Rea Rd. to N County Line	50	0	20	0	(a)	0
Cedar Lake Rd.	F-41 to Loud Rd.	20	0	(a)	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	(a)	0	(a)	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	20	0	(a)	0	(a)	0
Rea Rd.	River Rd. to F-41	20	0	(a)	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	20	0	(a)	0	(a)	0
1998							
U.S. 23	Johnson Rd. to River Rd.	80	15	40	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	90	0	50	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	190	133	90	23	50	0
U.S. 23	F-41 to Roadside Park	140	430	60	16	30	0
U.S. 23	Roadside Park to County Line	110	174	50	0	20	0
F-41	U.S. 23 to Skeel Ave.	30	0	(a)	0	(a)	0
F-41	Skeel Ave. to Rea Rd.	50	0	20	0	(a)	0
F-41	Rea Rd. to N County Line	50	0	20	0	(a)	0
Cedar Lake Rd.	F-41 to Loud Rd.	20	0	(a)	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	(a)	0	(a)	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	20	0	(a)	0	(a)	0
Rea Rd.	River Rd. to F-41	20	0	(a)	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	20	0	(a)	0	(a)	0

Note: (a) Contained within roadway.

Table J-11. Distance to DNL from Roadway Centerline for the No-Action Alternative
Page 2 of 2

Roadway	From/To	Distance (ft) DNL 65dB	Number of Residents	Distance (ft) DNL 70dB	Number of Residents	Distance (ft) DNL 75dB	Number of Residents
2003							
U.S. 23	Johnson Rd. to River Rd.	90	22	40	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	100	0	50	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	200	144	100	34	50	0
U.S. 23	F-41 to Roadside Park	150	482	70	67	30	0
U.S. 23	Roadside Park to County Line	110	214	70	0	30	0
F-41	U.S. 23 to Skeel Ave.	40	13	30	0	(a)	0
F-41	Skeel Ave. to Rea Rd.	50	0	20	0	(a)	0
F-41	Rea Rd. to N County Line	50	15	20	0	(a)	0
Cedar Lake Rd.	F-41 to Loud Rd.	2	0	(a)	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	(a)	0	(a)	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	20	0	(a)	0	(a)	0
Rea Rd.	River Rd. to F-41	20	0	(a)	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	20	0	(a)	0	(a)	0
2013							
U.S. 23	Johnson Rd. to River Rd.	100	28	50	0	20	0
U.S. 23	River Rd. to Cedar Lake Rd.	110	0	50	0	30	0
U.S. 23	Cedar Lake Rd. to F-41	220	166	110	45	50	0
U.S. 23	F-41 to Roadside Park	170	586	80	119	40	0
U.S. 23	Roadside Park to County Line	130	295	80	12	40	0
F-41	U.S. 23 to Skeel Ave.	40	0	30	0	(a)	0
F-41	Skeel Ave. to Rea Rd.	50	0	30	0	(a)	0
F-41	Rea Rd. to N County Line	50	0	30	0	(a)	0
Cedar Lake Rd.	F-41 to Loud Rd.	20	0	(a)	0	(a)	0
Loud Rd.	Cedar Lake Rd. to Loud Island	(a)	0	(a)	0	(a)	0
River Rd.	Detroit and Mackinac Railroad to Grass Lake Rd.	20	0	(a)	0	(a)	0
Rea Rd.	River Rd. to F-41	20	0	(a)	0	(a)	0
Bissonette Rd.	Rea Rd. to Alvin Rd.	20	0	(a)	0	(a)	0

Note: (a) Contained within roadway.

1.4 FIRE TRAINING ALTERNATIVE

This alternative includes only non-aviation land uses. Over half of the base would be used as a regional fire training facility. Other land uses include light industrial and warehousing, commercial office and retail, institutional education, existing residential, and public facilities/recreation.

Surface traffic data used in the modeling were developed from the project traffic study and are shown in Table J-7.

1.5 RECREATION ALTERNATIVE

This alternative includes only non-aviation land uses. The majority of the base would be restored to natural open space and conserved for potential multiuse recreation development. Other land uses include industrial, commercial, and institutional. Surface traffic data used in the modeling were developed from the project traffic study and are presented in Table J-7.

1.6 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the base property would not be put to further use. There would be no military activities/missions performed on the property. Surface traffic data used in the modeling were developed from the project traffic study and are presented in Table J-7.

2.0 NOISE METRICS

Noise, as used in this context, refers to sound pressure variations audible to the ear. The audibility of a sound depends on the amplitude and frequency of the sound and the individual's capability to hear the sound. Whether the sound is judged as noise depends largely on the listener's current activity and attitude toward the sound source, as well as the amplitude and frequency of the sound. The range in sound pressures which the human ear can comfortably detect encompasses a wide range of amplitudes, typically a factor larger than a million. To obtain convenient measurements and sensitivities at extremely low and high sound pressures, sound is measured in dB units. The dB is a dimensionless unit related to the logarithm of the ratio of the measured level to a reference level.

Because of the logarithmic nature of the dB unit, sound levels cannot be added or subtracted directly. However, the following shortcut method can be used to combine sound levels:

Difference between two dB values	Add the following to the higher level
0 to 1	3
2 to 3	2
4 to 9	1
10 or more	0

The ear is not equally sensitive at all frequencies of sound. At low frequencies, characterized as a rumble or roar, the ear is not very sensitive whereas at higher frequencies, characterized as a screech or a whine, the ear is most sensitive. The A-weighted level was developed to measure and report sound levels in a way which would more closely approach how people perceive the sound. All sound levels reported herein are in terms of A-weighted sound levels.

Environmental sound levels typically vary with time. This is especially true for areas near airports where noise levels will increase substantially as the aircraft passes overhead and afterwards diminish to typical community levels. Both the Department of Defense and the FAA have specified the following three noise metrics to describe aviation noise.

DNL is the 24-hour energy average A-weighted sound level with a 10 dB weighting added to those levels occurring between 10 p.m. and 7 a.m. the following morning. The 10 dB weighting is a penalty representing the added intrusiveness of noise during normal sleeping hours. DNL is used to determine land use compatibility with noise from aircraft and surface traffic. The expression L_{dn} is often used in equations to designate DNL.

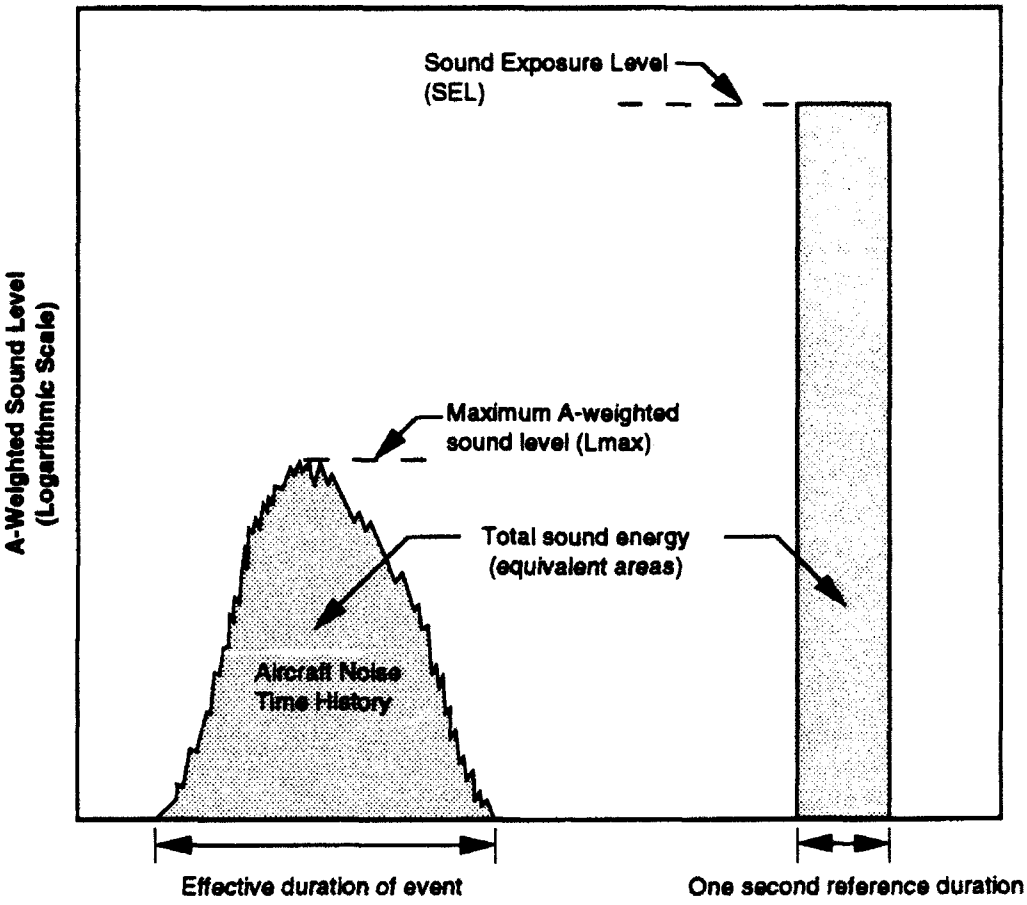
Maximum Sound Level is the highest instantaneous sound level observed during a single noise event no matter how long the sound may persist (Figure J-2).

Sound Exposure Level (SEL) value represents the A-weighted sound level integrated over the entire duration of the event and referenced to a duration of 1 second. Hence, it normalizes the event to a 1-second event. Typically, most events (aircraft flyover) last longer than 1 second, and the SEL value will be higher than the maximum sound level of the event. Figure J-2 illustrates the relationship between the maximum sound level and SEL.

3.0 NOISE MODELS

3.1 AIR TRAFFIC

The FAA-developed INM, Version 3.10, (Federal Aviation Administration, 1992) was used to predict aircraft flight noise levels. The INM computer program is a comprehensive set of computer routines for calculating noise contours from aircraft flight operations, using aircraft unique noise data for fixed-wing aircraft. The program requires specific input data, consisting of runway layout, aircraft types, number of operations, flight tracks, and noise performance data, to compute a grid of DNL values at irregular intervals. The grid is then processed by a contouring program which draws the contours at selected intervals.



Sound Exposure Level (SEL) and Comparison to Aircraft Noise Time History

Figure J-2

The FAA-approved Noise Exposure Model (NOISEMAP), Version 6.0 (Moulton, 1990), was used to predict aircraft ground runup noise levels. Since the early 1970s, the Department of Defense has been actively developing and refining the NOISEMAP program and its associated data base. The NOISEMAP computer program is a comprehensive set of computer routines for calculating noise contours from aircraft flight and ground runup operations, using aircraft unique noise data for both fixed- and rotary-wing aircraft. The program requires specific input data, consisting of runway and runup pad layout, aircraft types, number of operations, flight tracks, and noise performance data, to compute a grid of DNL values at uniform intervals. The grid is then processed by a contouring program which draws the contours at selected intervals.

The output results from INM and NOISEMAP were logarithmically added and composite contours developed.

3.2 SURFACE TRAFFIC

The Federal Highway Administration Highway Traffic Noise Prediction Noise Model was used to predict surface traffic noise. The model uses traffic volumes, vehicular mix, traffic speed, traffic distribution, and roadway length to estimate traffic noise levels.

4.0 ASSESSMENT CRITERIA

Criteria for assessing the effects of noise include annoyance, speech interference, sleep disturbance, noise-induced hearing loss, possible nonauditory health effects, reaction by animals, and land use compatibility. These criteria are often developed using statistical methods. The validity of generalizing statistics devised from large populations is suspect when applied to small sample sizes as we have in the affected areas near Wurtsmith AFB. Caution should be employed when interpreting the results of the impact analysis.

4.1 ANNOYANCE DUE TO SUBSONIC AIRCRAFT NOISE

Noise-induced annoyance is an attitude or mental process with both acoustic and nonacoustic determinants (Fidell et al., 1988). Noise-induced annoyance is perhaps most often defined as a generalized adverse attitude toward noise exposure. Noise annoyance is affected by many factors including sleep and speech interference and task interruption. The level of annoyance may also be affected by many nonacoustic factors.

In communities in which the prevalence of annoyance is affected primarily by noise, reductions in exposure can be expected to lead to reductions in prevalence of annoyance. In communities in which the prevalence of annoyance is controlled by nonacoustic factors, such as odor, traffic

congestion, etc., there may be little or no reduction in annoyance associated with reductions in exposure. The intensity of community response to noise exposure may even, in some cases, be essentially independent of physical exposure. In the case of community response to actions, such as airport siting or scheduling of supersonic transport aircraft, vigorous reaction has been encountered at the mere threat of exposure, or minor increases in exposure.

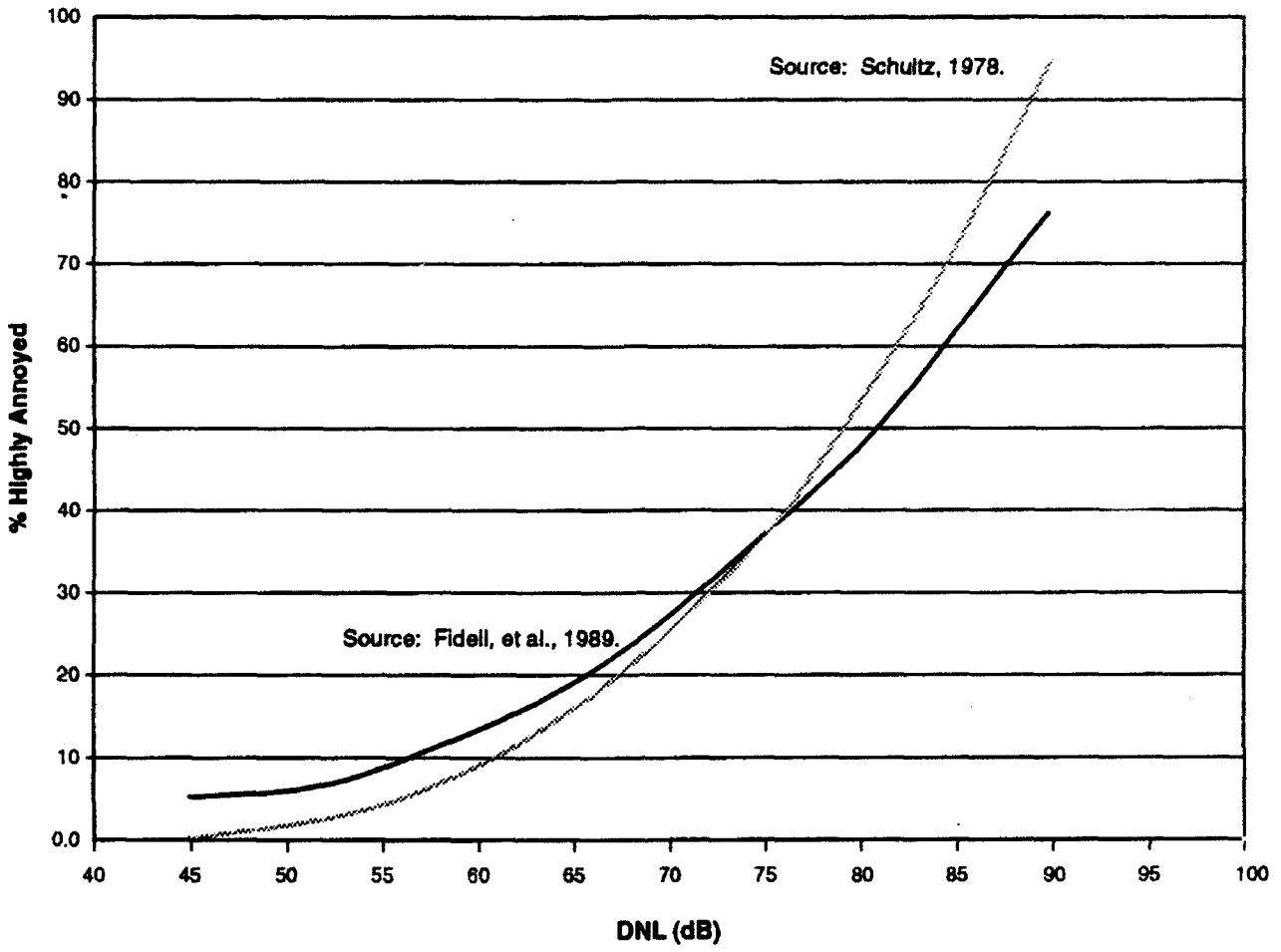
The standard method for determining the prevalence of annoyance in noise-exposed communities is by attitudinal survey. Surveys generally solicit self-reports of annoyance through one or more questions of the form "How bothered or annoyed have you been by the noise of (noise source) over the last (time period)?" Respondents are typically constrained in structured interviews to select one of a number of response alternatives, often named categories such as "Not at All Annoyed," "Slightly Annoyed," "Moderately Annoyed," "Very Annoyed," or "Extremely Annoyed." Other means are sometimes used to infer the prevalence of annoyance from survey data (for example, by interpretation of responses to activity interference questions or by construction of elaborate composite indices), with varying degrees of face validity and success.

Predictions of the prevalence of annoyance in a community can be made by extrapolation from an empirical dosage-effect relationship. Based on the results of a number of sound surveys, Schultz (1978) developed a relationship between percent highly annoyed and DNL:

$$\%\ \textit{Highly Annoyed} = 0.8553\ \textit{DNL} - 0.0401\ \textit{DNL}^2 + 0.00047\ \textit{DNL}^3$$

Note that this relationship should not be evaluated outside the range of DNL = 45 to 90 dB. Figure J-3 presents this equation graphically. Less than 15 to 20 percent of the population would be predicted to be annoyed by DNL values less than 65 dB, whereas over 37 percent of the population would be predicted to be annoyed from DNL values greater than 75 dB. The relationship developed by Schultz was presented in the *Guidelines for Preparing Environmental Impact Statements on Noise* (National Academy of Sciences, 1977).

These results were recently reviewed (Fidell et al., 1989) and the original findings updated with results of more recent social surveys, bringing the number of data points used in defining the relationship to over 400. The findings of the new study differ only slightly from those of the original study.



Community Noise Annoyance Curves

Figure J-3

4.2 SPEECH INTERFERENCE AND RELATED EFFECTS DUE TO AIRCRAFT FLYOVER NOISE

One of the ways that noise affects daily life is by preventing or impairing speech communication. In a noisy environment, understanding of speech is diminished by masking of speech signals by intruding noises. Speakers generally raise their voices or move closer to listeners to compensate for masking noise in face-to-face communications, thereby increasing the level of speech at the listener's ear. As intruding noise levels rise higher and higher, speakers may cease talking altogether until conversation can be resumed at comfortable levels of vocal effort after noise intrusions end.

If the speech source is a radio or television, the listener may increase the volume during a noise intrusion. If noise intrusions occur repeatedly, the listener may choose to set the volume at a high level so that the program material can be heard even during noise intrusions.

In addition to losing information contained in the masked speech material, the listener may lose concentration because of the interruptions and thus become annoyed. If the speech message is some type of warning, the consequences could be serious.

Current practice in quantification of the magnitude of speech interference and predicting speech intelligibility ranges from metrics based on A-weighted sound pressure levels of the intruding noise alone to more complex metrics requiring detailed spectral information about both speech and noise intrusions. There are other effects of the reduced intelligibility of speech caused by noise intrusions. For example, if the understanding of speech is interrupted, performance may be reduced, annoyance may increase, and learning may be impaired.

As the noise level of an environment increases, people automatically raise their voices. The effect does not take place, however, if the noise event rises to a high level very suddenly.

4.2.1 Speech Interference Effects from Time-Varying Noise

Most research on speech interference due to noise has included the study of steady state noise. As a result, reviews and summaries of noise effects on speech communications concentrate on continuous or at least long-duration noises (Miller, 1974). However, noise intrusions are not always continuous or of long duration, but are frequently transient in nature. Transportation noise generates many such noise intrusions, consisting primarily of individual vehicle pass-bys, such as aircraft flyovers. Noise emitted by other vehicles (motorboats, snowmobiles, and off-highway vehicles) is also transient in nature.

It has been shown, at least for aircraft flyover noise that accuracy of predictors of speech intelligibility are ranked in a similar fashion for both steady state and time-varying or transient sounds (Williams et al., 1971; Kryter and Williams, 1966). Of course, if one measures the noise of a flyover by the maximum A-level then intelligibility associated with this level would be higher than for a steady noise of the same value, simply because the level is less than the maximum for much of the duration of the flyover.

4.2.2 Other Effects of Noise Which Relate to Speech Intelligibility

Aside from the direct effects of reduction in speech intelligibility, related effects may occur that tend to compound the loss of speech intelligibility itself.

Learning. One of the environments in which speech intelligibility plays a critical role is the classroom. In classrooms of schools exposed to aircraft flyover noise, speech becomes masked or the teacher stops talking altogether during an aircraft flyover (Crook and Langdon, 1974). Pauses begin to occur when instantaneous flyover levels exceed 60 dB (A-weighted). Masking of the speech of teachers who do not pause starts at about the same level.

At levels of 75 dB some masking occurs for 15 percent of the flyovers and increases to nearly 100 percent at 82 dB. Pauses occur for about 80 percent of the flyovers at this noise level. Since a marked increase in pauses and masking occurs when levels exceed 75 dB, this level is sometimes considered as one above which teaching is impaired due to disruption of speech communication. The effect that this may have on learning is unclear at this time. However, one study (Arnoult et al., 1986) could find no effect of noise on cognitive tasks from jet or helicopter noise over a range from 60 to 80 dB (A-level), even though intelligibility scores indicated a continuous decline starting at the 60 dB level. In a Japanese study (Ando et al., 1975) researchers failed to find differences in mental task performance among children from communities with different aircraft noise exposure.

Although there seems to be no proof that noise from aircraft flyovers affects learning, it is reported by Mills (1975) that children are not as able to understand speech in the presence of noise as are adults. It is hypothesized that part of the reason is due to the increased vocabulary on which the adult can draw as compared to the more limited vocabulary available to the young student. Also, when one is learning a language, it is more critical that all words be heard rather than only enough to attain 95 percent sentence intelligibility, which may be sufficient for general conversations. It was mentioned above that when the maximum A-level for aircraft flyovers heard in a classroom exceeds 75 dB, masking of speech increases rapidly. However, it was also noted that pausing during flyovers and masking of

speech for those teachers who continue to lecture during a flyover start at levels around 60 dB (Pearsons and Bennett, 1974).

Annoyance. Klatt, Stevens, and Williams (1969) studied the annoyance of speech interference by asking people to judge the annoyance of aircraft noise in the presence and absence of speech material. The speech material was composed of passages from newspaper and magazine articles. In addition to rating aircraft noise on an acceptability scale (unacceptable, barely acceptable, acceptable, and of no concern), the subjects were required to answer questions about the speech material. The voice level was considered to represent a raised voice level (assumed to be 68 dB). In general, for the raised voice talker, the rating of barely acceptable was given to flyover noise levels of 73 to 76 dB. However, if the speech level was reduced, the rating of the aircraft tended more toward unacceptable. The results suggested that if the speech level were such that 95 percent or better sentence intelligibility was maintained, then a barely acceptable rating or better acceptability rating could be expected. This result is in general agreement with the finding in schools that teachers pause or have their speech masked at levels above 75 dB (Crook and Langdon, 1974).

Hall, Taylor, and Birnie (1985) recently tried to relate various types of activity interference in the home, related to speech and sleeping, to annoyance. The study found that there is a 50 percent chance that people's speech would be interfered with at a level of 58 dB. This result is in agreement with the other results, considering that the speech levels in the school environment of the Cook study are higher than the levels typically used in the home. Also, in a classroom situation the teacher raises his or her voice as the flyover noise increases in intensity.

4.2.3 Predicting Speech Intelligibility and Related Effects Due to Aircraft Flyover Noise

It appears, from the above discussions that, when aircraft flyover noises exceed approximately 60 dB, speech communication may be interfered with either by masking or by pausing on the part of the talker. Increasing the level of the flyover noise to 80 dB would reduce the intelligibility to zero even if a loud voice is used by those attempting to communicate.

The levels mentioned above refer to noise levels measured indoors. The same noises measured outdoors would be 15 to 25 dB higher than these indoor levels during summer (windows open) and winter months (windows closed), respectively. These estimates are taken from U.S. Environmental Protection Agency reviews of available data (U.S. Environmental Protection Agency, 1974).

Levels of the aircraft noise measured inside dwellings and schools near the ends of runways at airports may exceed 60 dB inside (75 dB outside).

During flyovers, speech intelligibility would be degraded. However, since the total duration is short, no more than a few seconds during each flyover, only a few syllables may be lost. People may be annoyed, but the annoyance may not be due to loss in speech communication, but rather due to startle or sleep disturbance as discussed below.

4.3 SLEEP DISTURBANCE DUE TO NOISE

The effects of noise on sleep have long been a concern of parties interested in assuring suitable residential noise environments. Early studies noted background levels in people's bedrooms in which sleep was apparently undisturbed by noise. Various levels between 25 and 50 dB (A-weighted) were observed to be associated with an absence of sleep disturbance. The bulk of the research on noise effects on which the current relationship is based was conducted in the 1970s. The tests were conducted in a laboratory environment n which awakening was measured either by a verbal response or by a button push, or by brain wave recordings indicating stages of sleep (and awakening). Various types of noise were presented to the sleeping subjects throughout the night. These noises consisted primarily of transportation noises including those produced by aircraft, trucks, cars, and trains. The aircraft noises included both flyover noises as well as sonic booms. Synthetic noises, including laboratory-generated sounds consisting of shaped noises and tones, were also studied.

Lukas (1975) and Goldstein and Lukas (1980) both reviewed data available in the 1970s on sleep-stage changes and waking effects of different levels of noise. Since no known health effects were associated with either waking or sleep-stage changes, either measure was potentially useful as a metric of sleep disturbance. However, since waking, unlike sleep-stage changes, is simple to quantify, it is often selected as the metric for estimating the effects of noise on sleep. These two reviews showed great variability in the percentage of people awakened by exposure to noise. The variability is not merely random error, but reflects individual differences in adaptation or habituation, and also interpretation of the meaning of the sounds. Such factors cannot be estimated from the purely acoustic measures in noise exposure.

Another major review, by Griefahn and Muzet (1978), provided similar information for effects of noise on waking. However, Griefahn and Muzet's results suggested less waking for a given level of noise than predicted by Lukas.

A recent review (Pearsons et al., 1989) of the literature related to sleep disturbance demonstrated that the relationship, based exclusively on laboratory studies, predicts greater sleep disturbance than that likely to occur in a real-life situation in which some adaptation has occurred. The prediction relationships developed in this review should not be considered to

yield precise estimates of sleep disturbance because of the great variability in the data sets from which they were developed. The relationships include only the duration and level components of "noise exposure." Increasing the precision of prediction would depend on quantification of some of the nonacoustic factors. Further, a recent review of field, as well as laboratory studies, suggests that habituation may reduce the effect of noise on sleep (Pearsons et al., 1989).

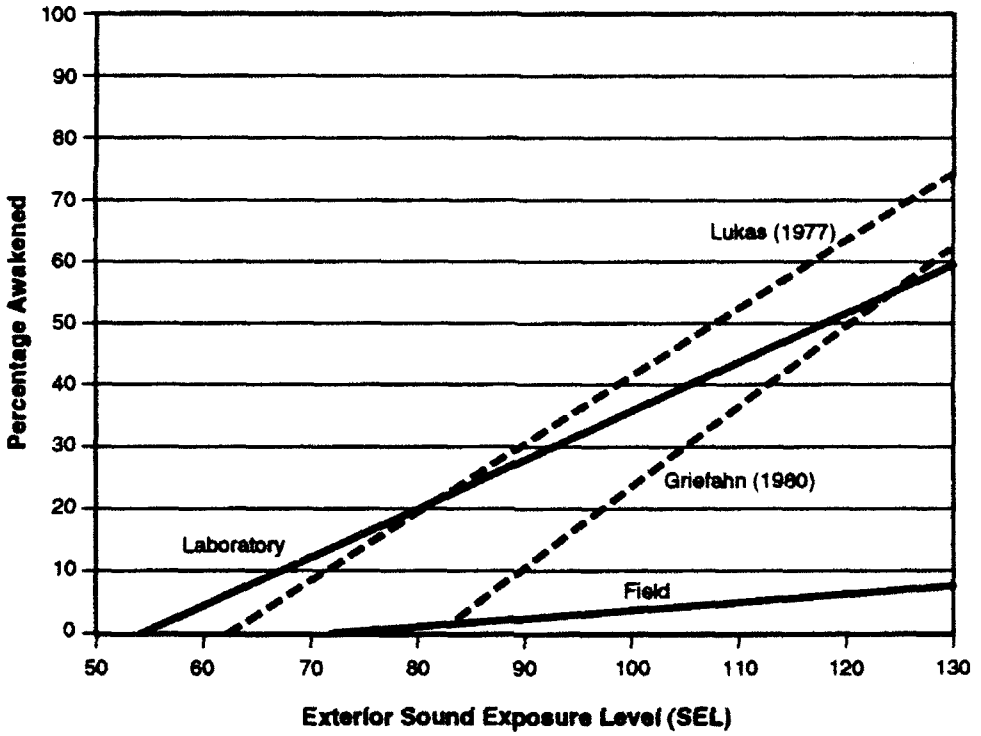
Noise must penetrate the home to disturb sleep. Interior noise levels are lower than exterior levels due to the attenuation of the sound energy by the structure. The amount of attenuation provided by the building is dependent on the type of construction and whether the windows are open or closed. The approximate national average attenuation factors are 15 dB (decibels) for open windows and 25 dB for closed windows (U.S. Environmental Protection Agency, 1974).

Incorporating these attenuation factors, the percent awakened relationships previously discussed under summer conditions are presented in Figure J-4. In conclusion, the scientific literature does not provide a consensus on sleep disturbance. There is no recognized criteria or standard which provides guidance to assess sleep disturbance due to noise.

4.4 NOISE-INDUCED HEARING LOSS

Hearing loss is measured in dB and refers to the permanent auditory threshold shift of an individual's hearing in an ear. *Auditory threshold* refers to the minimum acoustic signal that evokes an auditory sensation, i.e., the quietest sound a person can hear. When a threshold shift occurs a person's hearing is not as sensitive as before and the minimum sound that a person can hear must be louder. The threshold shift which naturally occurs with age is called presbycusis. Exposure to high levels of sound can cause temporary and permanent threshold shifts usually referred to as noise-induced hearing loss. Permanent hearing loss is generally associated with destruction of the hair cells of the inner ear.

The U.S. Environmental Protection Agency (1974) and the Committee on Hearing, Bioacoustics, and Biomechanics (National Academy of Sciences, 1977) have addressed the risk of outdoor hearing loss. They have concluded that hearing loss would not be expected for people living outside the noise contour of 75 DNL. Several studies of populations near existing airports in the United States and the United Kingdom have shown that the possibility for permanent hearing loss in communities near intense commercial takeoff and landing patterns is remote. An FAA-funded study compared the hearing of the population near the Los Angeles International Airport to that of the population in a quiet area away from aircraft noise (Parnel et al., 1972). A similar study was performed in the vicinity of London Heathrow Airport (Ward, Cushing and Burns, 1972). Both studies



Source: Pearsons et al, 1989

Sleep Disruption (Awakening)

Figure J-4

concluded that there was no significant difference between the hearing loss of the two populations, and no correlation between the hearing level with the length of time people lived in the airport neighborhood.

4.5 NONAUDITORY HEALTH EFFECTS OF NOISE

The current scientific consensus is that "evidence from available research reports is suggestive, but it does not provide definitive answers to the question of health effects, other than to the auditory system, of long-term exposure to noise" (National Academy of Sciences, 1981). Based on summaries of previous research in the field (Thompson, 1981; Thompson and Fidell, 1989), predictions of nonauditory health effects of aircraft noise cannot be made. A valid predictive procedure requires: (1) evidence for causality between aircraft noise exposure and adverse nonauditory health consequences; and (2) knowledge of a quantitative relationship between amounts of noise exposure (dose) and specific health effects. Because results of studies of aircraft noise on health are equivocal, there is no sound scientific basis for making adequate risk assessments.

Alleged nonauditory health consequences of aircraft noise exposure that have been studied include birth defects, low birth weight, psychological illness, cancer, stroke, hypertension, sudden cardiac death, myocardial infarction, and cardiac arrhythmias. Of these, hypertension is the most biologically plausible effect of noise exposure. Noise appears to cause many of the same biochemical and physiological reactions, including temporary elevation of blood pressure, as do many other environmental stressors. These temporary increases in blood pressure are believed to lead to a gradual resetting of the body's blood pressure control system. Over a period of years, permanent hypertension may develop (Peterson et al., 1984).

Studies of residential aircraft noise have produced contradictory results. Early investigations indicated that hypertension was from two to four times higher in areas near airports than in areas located away from airports (Karagodina et al., 1969). Although Meecham and Shaw (1988) continue to report excessive cardiovascular mortality among individuals 75 years or older living near the Los Angeles International Airport, their findings cannot be replicated (Frerichs et al., 1980). In fact, noise exposure increased over the years while there was a decline in all cause, age-adjusted death rates and inconsistent changes in age-adjusted cardiovascular, hypertension, and cerebrovascular disease rates.

Studies which have controlled for multiple factors have shown no, or a very weak, association between noise exposure and nonauditory health effects. This observation holds for studies of occupational and traffic noise as well as for aircraft noise exposure. In contrast to the early reports of two- to six-fold increases in hypertension due to high industrial noise (Thompson and

Fidell, 1989), the more rigorously controlled studies of Talbott et al. (1985) and van Dijk et al. (1987) show no association between hypertension and prolonged exposure to high levels of occupational noise.

In the aggregate, studies indicate no association exists between street traffic noise and blood pressure or other cardiovascular changes. Two large prospective collaborative studies of heart disease are of particular interest. To date, cross-sectional data from these cohorts offer contradictory results. Data from one cohort show a slight increase in mean systolic blood pressure (2.4 millimeters of mercury) in the noisiest compared to the quietest area; while data from the second cohort show the lowest mean systolic blood pressure and highest high-density lipoprotein cholesterol (lipoprotein protective of heart disease) for men in the noisiest area (Babisch and Gallacher, 1990). These effects of traffic noise on blood pressure and blood lipids were more pronounced in men who were also exposed to high levels of noise at work.

It is clear from the foregoing that the current state of technical knowledge cannot support inference of a causal or consistent relationship, nor a quantitative dose-response, between residential aircraft noise exposure and health consequences. Thus, no technical means are available for predicting extra-auditory health effects of noise exposure. This conclusion cannot be construed as evidence of no effect of residential aircraft noise exposure on nonauditory health. Current findings, taken in sum, indicate only that further rigorous studies are needed.

4.6 DOMESTIC ANIMALS AND WILDLIFE

A recent study was published on the effects of aircraft noise on domestic animals which provided a review of the literature and a review of 209 claims pertinent to aircraft noise over a period spanning 32 years (Bowles et al., 1990). Studies since the late 1950s were motivated both by public concerns about what was at that time a relatively novel technology, supersonic flight, and by claims leveled against the U. S. Air Force for damage done to farm animals by very low-level subsonic overflights. Since that time over 40 studies of aircraft noise and sonic booms, both in the United States and overseas, have addressed acute effects, including effects of startle responses (sheep, horses, cattle, fowl), and effects on reproduction and growth (sheep, cattle, fowl, swine), parental behaviors (fowl, mink), milk letdown (dairy cattle, dairy goats, swine), and egg production.

There is little literature on the effects of noise on domestic animals, and most of the studies have focused on the relation between dosages of continuous noise and effects. Chronic noises are not a good model for aircraft noise, which lasts only a few seconds, but which is often very

startling. The review of claims suggests that a major source of loss was panic induced in naive animals.

Aircraft noise may have effects because it might trigger a startle response, a sequence of physiological and behavioral events that once helped animals avoid predators. There are good dose-response relations describing the tendency to startle to various levels of noise, and the effect of habituation on the startle response.

The link between startles and serious effects, i.e., effects on productivity, is less certain. Here, we will define an effect as any change in a domestic animal that alters its economic value, including changes in body weight or weight gain, numbers of young produced, weight of young produced, fertility, milk production, general health, longevity, or tractability. At this point, changes in productivity are usually considered an adequate indirect measure of changes in well being, at least until objective legal guidelines are provided.

Recent focus on the effects on production runs counter to a trend in the literature toward measuring the relation between noise and physiological effects, such as changes in corticosteroid levels, and in measures of immune system function. As a result, it is difficult to determine the relation between dosages of noise and serious effects using only physiological measures. The experimental literature is inadequate to document long-term or subtle effects resulting from exposure to aircraft noise.

4.7 LAND USE COMPATIBILITY GUIDELINES

Widespread concern about the noise impacts of aircraft noise essentially began in the 1950s which saw the major introduction of high power jet aircraft into military service. The concern about noise impacts in the communities around airbases, and also within the airbases themselves, led the Air Force to conduct major investigations into the noise properties of jets, methods of noise control for test operations, and the effects of noise from aircraft operations in communities surrounding airbases. These studies established an operational framework of investigation and identified the basic parameters affecting community response to noise. These studies also resulted in the first detailed procedures for estimating community response to aircraft noise (Stevens and Pietrasanta, 1957).

Although most attention was given to establishing methods of estimating residential community response to noise (and establishing the conditions of noise "acceptability" for residential use), community development involves a variety of land uses with varying sensitivity to noise. Thus, land planning with respect to noise requires the establishment of noise criteria for different land uses. This need was met with the initial development of aircraft noise

compatibility guidelines for varied land uses in the mid-1960s (Bishop, 1964).

In residential areas, noise intrusions generate feelings of annoyance on the part of individuals. Increasing degrees of annoyance lead to the increasing potential for complaints and community actions (most typically, threats of legal actions, drafting of noise ordinances, etc.). Annoyance is based largely upon noise interference with speech communication, listening to radio and television, and sleep. Annoyance in the home may also be based upon dislike of "outside" intrusions of noise even though no specific task is interrupted.

Residential land use guidelines have developed from consideration of two related factors:

(a) Accumulated case history experience of noise complaints and community actions near civil and military airports

(b) Relationships between environmental noise levels and degrees of annoyance (largely derived from social surveys in a number of communities).

In the establishment of land use guidelines for other land uses, the prime consideration is task interference. For many land uses, this translates into the degree of speech interference, after taking into consideration the importance of speech communication and the presence of non-aircraft noise sources related directly to the specific land use considered. For some noise-sensitive land uses where any detectable noise signals, which rise above the ambient noise are unwanted (such as music halls), detectability may be the criterion rather than speech interference.

A final factor to be considered in all land uses involving indoor activities is the degree of noise insulation provided by the building structures. The land use guideline limits for unrestricted development within a specific land use assume noise insulation properties provided by typical commercial building construction. The detailed land use guidelines may also define a range of higher noise exposure where construction or development can be undertaken, provided a specified amount of noise insulation is included in the buildings. Special noise studies, undertaken by architectural or engineering specialists, may be needed to define the special noise insulation requirements for construction in these guideline ranges.

Estimates of total noise exposure resulting from aircraft operations, as expressed in DNL values, can be interpreted in terms of the probable effect on land uses. Suggested compatibility guidelines for evaluating land uses in aircraft noise exposure areas were originally developed by the FAA as presented in Section 3.4.4, Noise. Part 150 of the FAA regulations

prescribes the procedures, standards, and methodology governing the development, submission, and review of airport noise exposure maps and airport noise compatibility programs. It prescribes the use of yearly DNL in the evaluation of airport noise environments. It also identifies those land use types which are normally compatible with various levels of noise exposure. Compatible or incompatible land use is determined by comparing the predicted or measured DNL level at a site with the values given in the table. The guidelines reflect the statistical variability of the responses of large groups of people to noise. Therefore, any particular level might not accurately assess an individual's perception of an actual noise environment.

While the FAA guidelines specifically apply to aircraft noise, it should be noted that DNL is also used to describe the noise environment due to other community noise sources, including motor vehicles and railroads. The use of DNL is endorsed by the scientific community to assess land use compatibility as it pertains to noise (American National Standards Institute, 1990). Hence, the land use guidelines presented by the FAA can also be used to assess the noise impact from community noise sources other than aircraft.

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APPENDIX K

APPENDIX K

AIR EMISSIONS INVENTORY

AIR EMISSIONS INVENTORY

INTRODUCTION

The following tables contain the daily pollutant emissions associated with the Proposed Action and Fire Training and Recreation alternatives. Daily emissions were assumed to be constant, and were calculated based on the estimated annual emissions. Emissions are provided for the following:

- Aircraft operations
- Aircraft refueling
- Construction
- Fire training
- Forest fire training
- Other activities.

These projected emission estimates are included in Tables K-1 through K-5, by pollutant and by alternative.

AIRCRAFT OPERATIONS AND REFUELING

Emissions from aircraft activities, including touch and go, airplane queuing, and takeoff and landings, were calculated based on fleet mix and frequency information predicted for the Proposed Action for the years 1998 and 2003. Evaporative emissions from refueling of aircraft are based on predicted annual usage of aviation gasoline and a vapor recovery of 85 percent. These emissions were predicted using the Emissions and Dispersion Modeling System (EDMS) model (Segal, 1991), which contains a built-in data base of U.S. Environmental Protection Agency's (EPA's) AP-42 emission factors for various types of aircraft and refueling activities.

MOTOR VEHICLE ACTIVITIES

Emissions from motor vehicle exhaust on roadways associated with the base and automobile parking were estimated from project traffic patterns for the three phases of analysis for each alternative.

The EDMS was used to predict and model annual emissions based on the number of vehicles traveling on roadways and entering or leaving parking lots. The EDMS uses emission factors from EPA AP-42 to predict emissions from moving vehicles and cold starting of automobiles in parking areas.

Table K-1. Emissions Inventory for Particulate Matter (tons/day)

	Proposed Action		Fire Training Alternative		Recreation Alternative	
Source	1998	2003	1998	2003	1998	2003
Aircraft Operations	0.003	0.006	0	0	0	0
Aircraft Refueling	0	0	0	0	0	0
Construction	0.09	0.02	0.05	0.02	0.10	0.004
Fire Training	-	-	0.001	0.001	-	-
Forest Fire Training	-	-	0.34	0.34	-	-
Other Activities	0.59	0.74	0.26	0.39	0.12	0.21
Total	0.68	0.77	0.65	0.75	0.22	0.21

Table K-2. Emissions Inventory for Carbon Monoxide (tons/day)

	Proposed Action		Fire Training Alternative		Recreation Alternative	
Source	1998	2003	1998	2003	1998	2003
Aircraft Operations	0.32	1.05	0	0	0	0
Aircraft Refueling	0	0	0	0	0	0
Fire Training	-	-	0.007	0.013	-	-
Forest Fire Training	-	-	3.5	3.5	-	-
Other Activities	2.98	3.70	1.29	1.96	0.58	1.04
Total	3.30	4.75	4.79	5.47	0.58	1.04

Table K-3. Emissions Inventory for Sulfur Dioxide (tons/day)

	Proposed Action		Fire Training Alternative		Recreation Alternative	
Source	1998	2003	1998	2003	1998	2003
Aircraft Operations	0.003	0.004	0	0	0	0
Aircraft Refueling	0	0	0	0	0	0
Fire Training	-	-	0.0001	0.0002	-	-
Forest Fire Training	-	-	-	-	-	-
Other Activities	0.05	0.06	0.02	0.03	0.01	0.02
Total	0.053	0.064	0.02	0.03	0.01	0.02

Table K-4. Emissions Inventory for Oxides of Nitrogen (tons/day)

	Proposed Action		Fire Training Alternative		Recreation Alternative	
Source	1998	2003	1998	2003	1998	2003
Aircraft Operations	0.029	0.036	0	0	0	0
Aircraft Refueling	0	0	0	0	0	0
Fire Training	-	-	0.005	0.01	-	-
Forest Fire Training	-	-	0.04	0.04	-	-
Other Activities	0.35	0.44	0.15	0.23	0.07	0.12
Total	0.38	0.48	0.20	0.28	0.07	0.12

Table K-5. Emissions Inventory for Reactive Organic Compounds (tons/day)

	Proposed Action		Fire Training Alternative		Recreation Alternative	
Source	1998	2003	1998	2003	1998	2003
Aircraft Operations	0.07	0.099	0	0	0	0
Aircraft Refueling	0.00001	0.00001	0	0	0	0
Fire Training	-	-	0.0008	0.0016	-	-
Forest Fire Training	-	-	0.07	0.07	-	-
Other Activities	1.01	1.25	0.44	0.66	0.20	0.35
Total	1.08	1.35	0.51	0.73	0.20	0.35

Detailed information about traffic patterns on residential streets was not available. It was, therefore, assumed that relatively little arterial traffic occurs in the residential areas and that vehicle emissions would resemble those from parking lots, which include a certain number of cold starts. For the purposes of using EDMS, cold starts were assumed to be 20 percent on the roadways and 80 percent from the parking lots.

Emissions from increased motor vehicle traffic on highways and roads outside the base property boundaries (i.e., within Iosco County) were estimated assuming that the ratio of reuse alternative emissions to reuse alternative population is proportional to the ratio of the 1987 Iosco County emission levels to the total predicted population of Iosco County over the 20-year study period as described under "Other Activities". These predicted emissions were not included in the EDMS dispersion modeling analysis.

CONSTRUCTION

Fugitive dust would be generated during construction activities associated with aviation support, industrial, institutional, commercial, resident, and

public/recreation land uses. These emissions would be greatest during site clearing and grading activities. Uncontrolled fugitive dust (particulate matter) emissions from ground-disturbing activities are estimated to be emitted at a rate of 110 pounds per acre per day (EPA, 1985). The PM_{10} fraction of the total fugitive dust emissions is assumed to be 50 percent, or 55 pounds per acre per working day.

For the Proposed Action, it is estimated that construction on base would disturb a total of approximately 517 acres over the 10-year period of analysis. Approximately 430 acres would be disturbed during the time period 1993-1998, and approximately 87 acres would be disturbed during the period from 1998-2003. The area of disturbance in any one year was calculated by dividing the number of years of each period of disturbance into the corresponding acreage disturbed. Therefore, the area of disturbance in any one year during the time period of 1993-1998 would be 86 acres and during 1998-2003 the annual area of disturbance would be 17.4 acres. The analysis assumes that on average there are 200 working days per year (excluding weekends, bad weather, and holidays), and that half of these days (100) would be used for site preparation. It further assumes 4 acre-days of disturbance per acre, which represents the area and duration of disturbing activities for each acre. Thus, for the Proposed Action years 1998-2003, the amount of PM_{10} emissions are calculated as follows:

$$\frac{86 \text{ acres disturbed}}{\text{year}} \times \frac{4 \text{ acre-days of disturbance}}{\text{acre}} \times \frac{1 \text{ year}}{100 \text{ days}}$$

$$\times \frac{55 \text{ pounds } PM_{10}}{\text{acre-day}} = \frac{189.2 \text{ pounds } PM_{10}}{\text{day}}$$

Therefore, the amount of PM_{10} that would be released is estimated to be 189.2 pounds per day (0.09 ton per day) for 1993-1998. Similarly, 38.3 pounds per day (0.02 ton per day) would be released in 1998-2003. The impact of these PM_{10} emissions would cause elevated short-term concentrations, would be temporary, and would fall off rapidly with distance from the source.

Similar calculations for fugitive dust emissions were performed for construction emissions for the Fire Training and Recreation Alternatives. These results are included in the emissions inventory tables.

FIRE TRAINING

Annual emissions were calculated for each of three proposed fire activities in the Fire Training Alternative: dirty evolutions, clean evolutions, and forest fire training. Fires created in the dirty evolution use a mixture of 80 percent gasoline and 20 percent No. 2 fuel oil as fuel. Clean evolutions use bales of straw, loose straw, or propane to fuel training fires. The forest fire training

scenario proposed the actual burning of standing forest within the base perimeter.

The projected frequencies and quantities of fuel for each type of fire were obtained from the Great Lakes Fire Training Academy and the Michigan Department of Natural Resources and used in conjunction with emission factors from EPA AP-42 to determine emissions for each of the types of fires. Emission factors from the source category "open burning--municipal refuse" were used to estimate emissions from the burning of straw. Emission factors for the combustion of propane in industrial boilers were used to calculate emissions from propane fires and emission factors for the combustion of fuel oil in residential furnaces were used to approximate emissions from the gasoline/oil mixture because emission factors for open burning of gasoline and fuel oil were not available. These emission factors are believed to most closely approximate emissions resulting from these activities. Emission factors for fuel oil were used because the emission factors in AP-42 relating to gasoline combustion are from the source category "internal combustion engines" which would not represent conditions found in the open burning of gasoline. Further, fuel oil, as a rule, burns dirtier (creates more pollutants) than gasoline. Emission factors for the forest fire training scenario are taken from the AP-42 source category "forest wildfires." An average tree loading of 10 tons/acre for conifer forests in the north-central United States is also taken from AP-42.

The EPA model SCREEN Version 1.11 was selected to model missions from fire training activities. Fires were modeled as area sources using stability Class 5, which was assumed to represent the worst case daytime meteorologic conditions. Worst case emissions from the dirty or clean evolutions were used to predict the impact on the ambient air from daily fire training activities. Emissions from the burning of straw represented the worst case for carbon monoxide and PM_{10} while emissions from the combustion of fuel oil were used to represent worst case for NO_x and SO_x. A source elevation of 6 feet was used to approximate thermal plume rise since the model ignores the possibility that an area source may be combustive in nature. The 6-foot elevation is assumed to be a conservative estimate of actual flame height and should represent worst case conditions even if no plume rise due to thermal convection occurs.

The impacts of the daily fire training activities were combined with the impacts predicted by EDMS from motor vehicle activity.

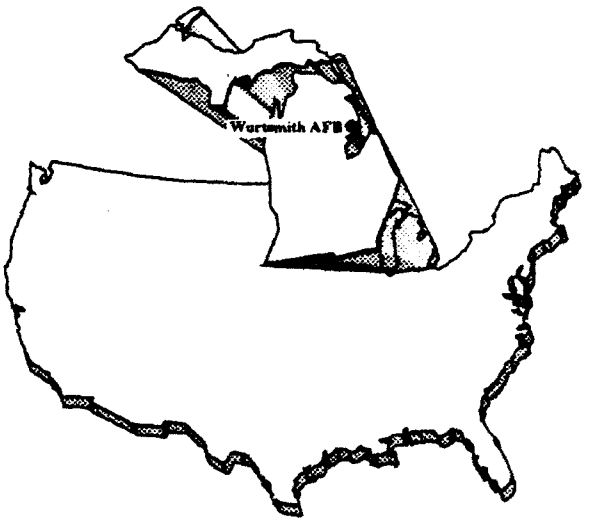
The SCREEN model was also used to model emissions from forest fire training activities. A stability class of 5 was again used with an area source elevation of 15 feet.

Since the forest fire training activities are expected to be scheduled only about one day per year, the impact of emissions over an annual averaging period is not appropriate. The impacts resulting from this activity will be short term only. Thus, the modeled results for the forest fire activities as presented in Table 4.4-8 do not include annual equivalents.

OTHER ACTIVITIES

The emissions from other activities (i.e., residential fuel combustion, motor vehicles waste burning, industrial processes, and miscellaneous processes) were developed assuming that the ratio of reuse alternative emissions to reuse alternative population is proportional to the ratio of the 1987 Iosco County emission levels to the total predicted population of Iosco County over the 10-year study period.

The basic equation used to develop the reuse alternative emission inventory data is: Reuse Emissions = (Iosco County Emissions/Iosco County Population) x Incremental Reuse Population Increase.



APPENDIX L

APPENDIX L

AGENCY LETTERS AND CERTIFICATIONS

File: 15-1-20-1-17
LAK

MICHIGAN DEPARTMENT OF STATE

RICHARD H. AUSTIN • SECRETARY OF STATE

LANSING
MICHIGAN 48918

Bureau of History, State Historic Preservation Office
Michigan Library and Historical Center
717 West Allegan Street
Lansing, Michigan 48918-1800

June 1, 1993

Mr. Russel Farringer
AFCEE/ESER
Building 1161
Brooks Air Force Base, Texas 78235-5000

RE: ER-880158 Closure, Wurtsmith Air Force Base, Iosco County (USAF)

Dear Mr. Farringer:

In a letter dated August 20, 1992, we stated the opinion that this project would affect no historic properties and that the project was cleared under federal regulation 36 CFR 800 for the "Protection of Historic Properties." It has come to our attention that this clearance letter was issued prematurely. There are concerns about archaeological resources on Wurtsmith Air Force base that were not resolved before the clearance letter was issued.

The draft Environmental Impact Statement regarding the disposal and reuse of Wurtsmith Air Force base contains a reference (p.3-92) to an archaeological survey report prepared by Mark Branstner in 1991. This survey was performed under the conditions of a prime contract between Tetra Tech, Inc. of San Bernadino, California and the U.S. Air Force (contract No. F04607-90-C0010). The report on the results of the survey is entitled "Cultural Resources Survey, Wurtsmith Air Force Base, Michigan."

The Michigan State Historic Preservation Officer did not receive a copy of this report when the work was completed. As a result, we had no record of the work that was done or of the results of the survey. After becoming aware that this survey had been done, we recently obtained a copy of the report. It was immediately apparent that the report is a crucial document in the process of assessing the archaeological sensitivity of the base. In particular, the report makes a number of important recommendations about further work that needs to be done in order to ensure that those parts of the base that hold potential for archaeological sites are thoroughly examined. One primary concern stated in the report is the fact that contractual specifications did not provide for subsurface testing during the 1990 survey. Since some form of subsurface testing is a standard archaeological technique necessary for reliable survey results, especially under field conditions where ground surface exposure is lacking, the report recommends that subsurface testing be performed in certain areas on the base.

We feel it is important that the archaeological work recommended in the Great Lakes Research report be completed in order that a thorough assessment of the archaeological

sensitivity of the base can be made. We know that this creates an untimely interruption in the process of closing the base. We are also, however, dismayed that we did not receive a copy of the archaeological survey report and therefore were not kept abreast of the status of the evaluation of archaeological resources on the base.

This letter supersedes our previous letter of August 20, 1992 in which we stated the opinion that this project would affect no historic properties and that the project was cleared under federal regulation 36 CFR 800 for the "Protection of Historic Properties." Given the new information provided in the survey report, it is our opinion that the section 106 review process has not been completed. We request that the archaeological work described in the "Recommendations" section (pp.26-28) of the Great Lakes Research report be completed. After the work has been completed and a report prepared, a copy of the report should be forwarded to the Michigan SHPO so that the information can be taken into account in our review of the project.

If you have any questions, please contact the Environmental Review Coordinator at (517) 335-2721. Thank you for this opportunity to review and comment.

Sincerely,

Kathryn B. Eckert

Kathryn B. Eckert
State Historic Preservation Officer

KBE:DLA:em

cc: Valerie DeCarlo, Advisory Council on Historic Preservation

MICHIGAN DEPARTMENT OF STATE
RICHARD H. AUSTIN • SECRETARY OF STATE
LANSING
MICHIGAN 48918

Bureau of History, State Historic Preservation Office
Michigan Library and Historical Center
717 West Allegan Street
Lansing, Michigan 48918-1800
August 20, 1992

Mr. Russel Farringer
AFCEE/ESER
Building 1161
Brooks Air Force Base, Texas 78235-5000

RE: ER-880158 Closure, Wurtsmith Air Force Base, Iosco County (USAF)

Dear Mr. Farringer:

Under the authority of the National Historic Preservation Act of 1966, as amended, we have reviewed the above-cited project at the location noted above. It is the opinion of the State Historic Preservation Officer (SHPO) that the project will affect no historic properties (no known sites eligible for listing in the National Register of Historic Places) and that the project is cleared under federal regulation 36 CFR 800 for the "Protection of Historic Properties."

Please maintain a copy of this letter with your environmental review record for this project. If the scope of work changes in any way, or if artifacts or bones are discovered, please contact this office immediately. This letter evidences your compliance with 36 CFR 800.4, "Identifying Historic Properties," and the fulfillment of your responsibility to notify this office under 36 CFR 800.4(d), "When no historic properties found."

If you have any questions, please contact the Environmental Review Coordinator at (517) 335-2720 or 335-2721. Thank you for this opportunity to review and comment.

Sincerely,

Kathryn B. Eckert
State Historic Preservation Officer

KBE:ROC:SBM:ps
cc Anne Weinheimer, ACHP

STATE OF MICHIGAN

Commission of Agriculture
Donald W. Nugent
Dave Crumbaugh
Jordan B. Tatter
Rita M. Reid
John A. Spero

JOHN ENGLER, Governor

DEPARTMENT OF AGRICULTURE

P.O. BOX 30017, LANSING, MICHIGAN 48909

BILL SCHUETTE, Director

May 21, 1992

Russel Farringer
Department of the Air Force
AFCEE/ESER,
Brooks AFB, TX 78235

Dear Mr. Farringer

Wurtsmith AFB contains no prime or unique farmland as determined by the Soil Conservation Service and County officals.]

If you need any further information please call me at (616) 362-7474 or write.

Sincerely,

Erik P. Johnson
Project Leader
Iosco County Soil Survey

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request: 13 May 1992
Name Of Project: Wurtsmith AFB Disposal and Reuse	Federal Agency Involved: U.S. Department of the Air Force
Proposed Land Use: Complete Closure of the Base Facilities	County And State: Iosco Co., Michigan
PART II *(To be completed by SCS)*	Date Request Received By SCS:

Does the site contain prime, unique, statewide or local important farmland? Yes ☐ No ☒
(If no, the FPPA does not apply – do not complete additional parts of this form).

Acres Irrigated	Average Farm Size

Major Crop(s)	Farmable Land In Govt. Jurisdiction	Amount Of Farmland As Defined in FPPA
	Acres: %	Acres: %

Name Of Land Evaluation System Used	Name Of Local Site Assessment System	Date Land Evaluation Returned By SCS

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	5,221			
B. Total Acres To Be Converted Indirectly				
C. Total Acres In Site	5,221			
PART IV *(To be completed by SCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				
PART V *(To be completed by SCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*				
PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points			
1. Area In Nonurban Use				
2. Perimeter In Nonurban Use				
3. Percent Of Site Being Farmed				
4. Protection Provided By State And Local Government				
5. Distance From Urban Builtup Area				
6. Distance To Urban Support Services				
7. Size Of Present Farm Unit Compared To Average				
8. Creation Of Nonfarmable Farmland				
9. Availability Of Farm Support Services				
10. On-Farm Investments				
11. Effects Of Conversion On Farm Support Services				
12. Compatibility With Existing Agricultural Use				
TOTAL SITE ASSESSMENT POINTS	160			
PART VII *(To be completed by Federal Agency)*				
Relative Value Of Farmland *(From Part V)*	100			
Total Site Assessment *(From Part VI above or a local site assessment)*	160			
TOTAL POINTS *(Total of above 2 lines)*	260			

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection

(See Instructions on reverse side)

Form AD-1006 (10-83)

United States Department of the Interior
Fish and Wildlife Service
East Lansing Field Office (ES)
1405 South Harrison Road, Room 302
East Lansing, Michigan 48823

TAKE PRIDE IN AMERICA

In Reply Refer to:

June 16, 1992

Russel Farringer
AFCEE/ESER
Brooks Air Force Base, TX 78235

Re: Notice of Intent for Disposal and Reuse of Wurtsmith Air Force Base, Iosco County, Michigan.

Dear Mr. Farringer:

This is in response to your request of May 13, 1991, for U.S. Fish and Wildlife Service (Service) comments on potential impacts to Federally-listed endangered, threatened, proposed or candidate species within the area of the proposed project.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et. seq.) and are consistent with the intent of the National Environmental Policy Act of 1969 (P.L. 92-190; 83 Stat. 852-856). These comments do not represent the views of the U.S. Department of the Interior on any forthcoming environmental statement.

Endangered Species Act Comments

The Service has determined that there are presently no Federally-listed endangered, threatened or proposed species in the project area. This precludes the need for further action on this project as required by the Endangered Species Act of 1973, as amended. However, if the project is modified or new information about the project becomes available that indicates listed or proposed species may be present and/or affected, consultation with this Service office should be reintiated.

The Service further advises that should any species occurring in the project area become Federally listed or proposed, the Federal action agency for the work would also be required to reevaluate its responsibilities under the Act. Since threatened and endangered species data is continually updated, the Service suggests you annually request an updated Federal ist of the species occurring in the project area.

We confirm that the date of our last letter was December 12, 1991, and not December 12, 1990, this was a typographical error and we apologize for any inconvenience caused by this oversight.

We appreciate the opportunity to provide these comments and look forward to continued coordination with your agency. We request the opportunity to receive the draft EIS for this project and provide comments if appropriate. Any questions can be directed to Susan Walker at this office at (517) 337-6650.

Sincerely yours,

John D. Cooper

for Charles M. Wooley
Field Supervisor

L-6

cc: Michigan Department of Natural Resources, Wildlife Division, Lansing, MI
(Attn: Tom Weise)

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APPENDIX M

APPENDIX M

INFLUENCING FACTORS AND ENVIRONMENTAL IMPACTS OF WURTSMITH AIR FORCE BASE REUSE BY LAND USE CATEGORY

INFLUENCING FACTORS AND ENVIRONMENTAL IMPACTS OF WURTSMITH AIR FORCE BASE REUSE BY LAND USE CATEGORY

INTRODUCTION

The purpose of this appendix is to quantify the environmental impacts of each land use category identified for the three alternatives, including the Proposed Action, evaluated in this Environmental Impact Statement (EIS). The data in Tables M-1 through M-16 present the impacts of individual land use activities, such as industrial, commercial, or institutional, on their respective Regions of Influence and allow comparison of the impacts of the Proposed Action and alternatives for three benchmark years, 1998, 2003, and 2013, where applicable. Figures M-1 through M-3 display the parcels in the various land use categories for each alternative.

Tables M-1 through M-4 present data on the influencing factors (factors that drive environmental impacts); Tables M-5 through M-16 list the impacts on individual environmental resources evaluated in the EIS. These resources include transportation, utilities, hazardous materials and hazardous waste management, soils and geology, water resources, air quality, noise, biological resources, and cultural resources. This appendix includes at least one table for each resource area, except water resources and cultural resources. Data on water demand are presented as part of the utilities analysis; the effects on surface and groundwater resources in and around the base have not been quantified in the EIS and have not been disaggregated in this appendix. There would be no cultural resources impacts, because there are no historic properties on the base.

No quantification is provided in Table M-11 because the quantities of hazardous materials used and hazardous wastes generated will depend on the type and intensity of industrial and commercial activities developed on the site. Table M-11 presents a generalized description of the hazardous materials used under individual land use categories. Table M-12 summarizes the number of Installation Restoration Program (IRP) sites identified on the base as of 1992, but does not give the likely status of these sites in 1998, 2003, and 2013.

Factors and assumptions used in disaggregating the total impacts of an alternative into individual land use categories are presented as footnotes on the relevant tables.

Table M-1. Direct Employment by Land Use Category, Wurtsmith AFB Reuse

	1998			2003			2013		
Land Use Category	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2
Airfield	0	0	0	0	0	0	0	0	0
Aviation support	1,180	0	0	1,281	0	0	1,384	0	0
Industrial	736	318	153	975	629	237	1,232	682	350
Institutional (medical/educational)	98	118	64	131	194	93	165	302	147
Commercial	913	805	290	1,073	998	578	1,504	1,459	903
Residential	10	0	6	0	0	0	0	0	0
Public facilities/recreation	0	67	60	0	55	71	0	55	73
Total	2,938	1,308	572	3,461	1,876	979	4,285	2,498	1,473

Table M-2. Total Employment* by Land Use Category, Wurtsmith AFB Reuse

	1998			2003			2013		
Land Use Category	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2
Airfield	0	0	0	0	0	0	0	0	0
Aviation support	1,920	0	0	2,076	0	0	2,217	0	0
Industrial	1,199	456	225	1,579	935	351	1,973	1,008	519
Institutional (medical/educational)	160	169	95	213	288	138	265	446	218
Commercial	1,486	1,156	428	1,739	1,485	855	2,412	2,154	1,340
Residential	16	0	8	0	0	0	0	0	0
Public facilities/recreation	0	97	89	0	81	106	0	81	108
Total	4,781	1,878	845	5,607	2,789	1,450	6,867	3,689	2,185

* Total employment includes direct and secondary employment.

P.A. = Proposed Action.
Alt. 1 = Fire Training Alternative.
Alt. 2 = Recreation Alternative.

Table M-3. Population In-Migration* by Land Use Category, Wurtsmith AFB Reuse

	1998			2003			2013		
Land Use Category	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2
Airfield	0	0	0	0	0	0	0	0	0
Aviation support	2,008	0	0	2,296	0	0	2,697	0	0
Industrial	1,254	522	261	1,748	1,099	420	2,401	1,297	673
Institutional (medical/educational)	168	193	107	235	338	165	321	574	283
Commercial	1,555	1,322	495	1,924	1,743	1,024	2,932	2,774	1,738
Residential	17	0	13	0	0	0	0	0	0
Public facilities/recreation	0	111	102	0	95	126	0	104	140
Total	5,002	2,148	977	6,203	3,275	1,736	8,352	4,749	2,835

* Population in-migration is based on projected total employment for each land use category. Some population inmigration is assumed to occur for the public/recreation land use under the Fire Training and Recreation alternatives.

Table M-4. Land Use Impacts by Land Use Category, Wurtsmith AFB Reuse

	1998			2003			2013		
Land Use Category	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2
Airfield	1,025	0	0	1,025	0	0	1,025	0	0
Aviation support	153	0	0	230	0	0	275	0	0
Industrial	200	75	80	250	150	120	489	234	193
Institutional (medical/educational)	7	992	51	10	1,512	54	12	3,127	60
Commercial	111	44	27	205	57	47	216	130	62
Residential	178	41	10	303	96	29	354	250	92
Public facilities/recreation	2,232	873	4,099	2,274	885	4,099	2,255		4,219
Total	3,906	2,025	4,267	4,297	2,700	4,349	4,626	4,626	4,626

P.A. = Proposed Action.
Alt. 1 = Fire Training Alternative.
Alt. 2 = Recreation Alternative.

Table M-5. Transportation Impacts* by Land Use Category, Wurtsmith AFB Reuse (average daily trips)

	1998			2003			2013		
Land Use Category	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2
Airfield	109	0	0	124	0	0	151	0	0
Aviation support	2,534	0	0	3,746	0	0	4,175	0	0
Industrial	2,454	1,058	560	3,112	2,116	825	3,939	2,308	1,198
Institutional (medical/educational)	1,613	1,694	3,996	2,151	3,058	4,381	2,688	4,210	4,951
Commercial	5,096	12,371	6,233	8,432	14,386	9,396	10,074	16,009	11,793
Residential	1,761	405	30	2,949	946	90	3,481	2,161	180
Public facilities/recreational	3,406	1,342	1,866	5,066	1,373	1,866	5,066	1,373	2,866
Total	16,973	16,870	12,685	25,580	21,879	16,558	29,574	26,061	20,988

* The number of vehicle trips expected as a result of specific land uses was estimated on the basis of direct on-site jobs and other attributes of on-site land uses (such as the number of dwelling units, commercial and industrial development, and other factors).

Table M-6. Water Demand* by Land Use Category, Wurtsmith AFB Reuse (gallons per day)

	1998			2003			2013		
Land Use Category	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2
Airfield	0	0	0	0	0	0	0	0	0
Aviation support	17,500	0	0	26,250	0	0	35,000	0	0
Industrial	39,123	5,145	2,685	79,432	10,290	4,028	118,555	10,290	5,370
Institutional (medical/educational)	12,525	14,455	12,941	25,050	24,530	18,195	25,050	39,720	29,475
Commercial	27,840	32,997	12,105	52,073	43,452	19,915	55,680	47,604	25,460
Residential	131,760	24,624	1,368	223,992	57,456	4,104	263,520	131,328	8,208
Public facilities/recreation	58,323	75,728	79,448	58,989	75,728	79,448	58,989	75,728	75,728
Total	287,071	152,949	108,547	465,786	211,456	125,690	556,794	304,670	144,241

* On-site demand.

P.A. = Proposed Action.
Alt. 1 = Fire Training Alternative.
Alt. 2 = Recreation Alternative.

Table M-7. Wastewater Generation* by Land Use Category, Wurtsmith AFB Reuse (gallons per day)

Land Use Category	1998			2003			2013		
	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2
Airfield	0	0	0	0	0	0	0	0	0
Aviation support	10,500	0	0	15,750	0	0	21,000	0	0
Industrial	30,482	3,430	1,790	61,888	6,860	2,685	92,370	6,860	3,580
Institutional (medical/educational)	10,438	12,778	8,863	20,875	21,575	12,600	20,875	34,758	14,950
Commercial	11,685	6,408	6,430	20,965	14,780	11,090	23,370	22,640	14,240
Residential	109,800	68,400	1,140	186,660	136,800	3,420	219,600	136,800	6,840
Public facilities/recreation	500	500	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total	173,405	91,516	19,223	307,138	181,015	30,795	378,215	202,058	40,610

Table M-8. Solid Waste Generation* by Land Use Category, Wurtsmith AFB Reuse (tons per day)

Land Use Category	1998			2003			2013		
	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2
Airfield	0	0	0	0	0	0	0	0	0
Aviation support	1.05	0	0	1.58	0	0	2.10	0	0
Industrial	0.20	0.17	0.09	0.41	0.34	0.13	0.62	0.34	0.18
Institutional (medical/educational)	0.42	0.52	0.36	0.84	0.86	0.50	0.84	1.35	0.60
Commercial	1.37	1.47	0.60	2.27	2.12	1.3	2.75	2.68	1.70
Residential	2.75	0.51	0.03	4.67	1.20	0.09	5.49	2.74	0.17
Public facilities/recreation	0.25	0.50	0	0.50	0.50	0	0.50	0.50	0
Total	6.04	3.17	1.08	10.27	5.02	2.02	12.3	7.61	2.65

* On-site generation.

P.A. = Proposed Action.
Alt. 1 = Fire Training Alternative.
Alt. 2 = Recreation Alternative.

Table M-9. Electricity Demand* by Land Use Category, Wurtsmith AFB Reuse (megawatt-hours per day)

	1998			2003			2013		
Land Use Category	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2
Airfield	0	0	0	0	0	0	0	0	0
Aviation support	5.38	0	0	8.07	0	0	10.76	0	0
Industrial	1.90	10.47	7.18	3.87	20.95	10.78	5.78	20.95	14.37
Institutional (medical/educational)	2.21	3.80	6.52	4.42	5.74	9.00	4.42	6.82	9.92
Commercial	6.89	8.98	3.18	13.30	13.26	6.24	13.79	17.07	8.10
Residential	10.58	2.47	0.18	17.99	5.76	.54	21.16	13.18	1.09
Public facilities/recreation	1.09	1.39	2.99	2.18	1.39	2.99	2.18	1.39	2.99
Total	28.05	27.11	20.05	49.83	47.10	29.55	58.09	59.41	36.47

Table M-10. Natural Gas Demand* by Land Use Category, Wurtsmith AFB Reuse (therms per day)

	1998			2003			2013		
Land Use Category	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2
Airfield	0	0	0	0	0	0	0	0	0
Aviation support	743	0	0	1,115	0	0	1,486	0	0
Industrial	198	1,085	744	402	2,170	1,117	599	2,170	1,489
Institutional (medical/educational)	187	905	842	375	1,338	1,149	375	1,493	1,227
Commercial	549	725	300	1,033	1,178	669	1,099	1,688	877
Residential	2,349	5	0	3,994	13	0	4,699	28	0
Public facilities/recreation	159	193	434	317	591	434	317	193	434
Total	4,185	2,913	2,320	7,236	5,290	3,369	8,575	5,572	4,027

* On-site demand.

P.A. = Proposed Action.
Alt. 1 = Fire Training Alternative.
Alt. 2 = Recreation Alternative.

Table M-11. Hazardous Materials Usage* by Land Use Category, Wurtsmith AFB Reuse, 1998-2013

Land Use Category	Proposed Action	Fire Training Alternative	Recreation Alternative
Airfield	Aviation fuels, propylene glycol, ethylene glycol, heating oils	NA	NA
Aviation support	Fuels, solvents, paints, POL, hydraulic fluids, degreasers, corrosives, heavy metals, reactives, thinners, paints, glycols, ignitibles, heating oils, cyanides	NA	NA
Industrial	Solvent, heavy metals, POL, corrosives, catalysts, aerosols, fuels, heating oils, ignitibles, pesticides	Same as Proposed Action	Same as Proposed Action
Institutional (medical/educational)	Pharmaceuticals, chemotherapeutic drugs, radiological sources, heavy metals	Fuels/fuel oils, flares, propane, solvents, heating oils, solvents, cleaners, pesticides, paints, thinners, fire extinguishing agents, ignitibles, alcohol, magnesium, aluminum	Corrosives, ignitables, solvents, heating oils, lubricants, cleaners, pesticides, paints, thinners
Commercial	Fuels, solvents, corrosives, POL, ignitibles, heating oils, pesticides, dry cleaning fluids	Same as Proposed Action	Same as Proposed Action
Residential	Pesticides, fertilizers, fuels, oils, chlorine, household chemicals	Same as Proposed Action	Same as Proposed Action
Public/recreation	Pesticides, fertilizers, chlorine, heating oils, paints, thinners, cleaners, solvents, aerosols, POL	Same as Proposed Action	Same as Proposed Action

* Quantities of hazardous materials used will depend on the specific industrial development and are not reported here.
NA = Not applicable.
POL = petroleum, oil, and lubricants.

Table M-12. Number of Installation Restoration Program Sites* by Land Use Category Wurtsmith AFB Reuse

Land Use Category	1992		
	P.A.	Alt. 1	Alt. 2
Airfield	13	NA	NA
Aviation support	14	NA	NA
Industrial	18	19	20
Institutional (medical/educational)	0	26	2
Commercial	5	7	8
Residential	1	1	1
Public/recreation	18	17	40

* Table shows Installation Restoration Program sites as of 1992. The number of sites over the 1992-2013 period would change as remediation measures are implemented for individual sites.

Table M-13. Soils and Geology* Impacts by Land Use Category, Wurtsmith AFB Reuse, 1998-2013 (acres of soil disturbance)

Land Use Category	P.A.	Alt. 1	Alt. 2
Airfield	50	0	0
Aviation support	29	0	0
Industrial	81	43	29
Institutional (medical/educational)	0	204	8
Commercial	41	45	30
Residential	72	26	6
Public/recreation	278	33	541
Total	551	351	614

* Disturbance of soils would depend upon the construction schedules of various facilities on base. Therefore, no breakdown is provided for the benchmark years 1998, 2003, 2013.

P.A. = Proposed Action.
Alt. 1 = Fire Training Alternative.
Alt. 2 = Recreation Alternative.

Table M-14. Air Quality Impacts by Land Use Category, Wurtsmith AFB Reuse (total emissions* in tons/day)

	1998			2003		
Land Use Category	P.A.	Alt. 1	Alt. 2	P.A.	Alt. 1	Alt. 2
Airfield	0.46	0	0	1.23	0	0
Aviation support	0.76	0	0	0.91	0	0
Industrial	0.73	0.14	0.05	0.76	0.32	0.09
Institutional (medical/educational)	0.48	4.18	0.34	0.52	4.44	0.46
Commercial	1.52	1.61	0.53	2.05	2.16	0.99
Residential	0.53	0.05	0	0.72	0.14	0.01
Public facilities/recreation	1.02	0.18	0.16	1.23	0.21	0.20
Total	5.50	6.16	1.08	7.42	7.26	1.74

* For airfield land use category, emissions are based on the aircraft flying operations; for institutional land use category in Fire Training Alternative, emissions are based on fire training activities. For all other categories, emissions are based on average daily traffic generated by each land use category (Table M-5).

Table M-15. Expected Noise Levels by Land Use Category, Wurtsmith AFB Reuse, 1998-2013
(Typical Day-Night Average Sound Level in Decibels)

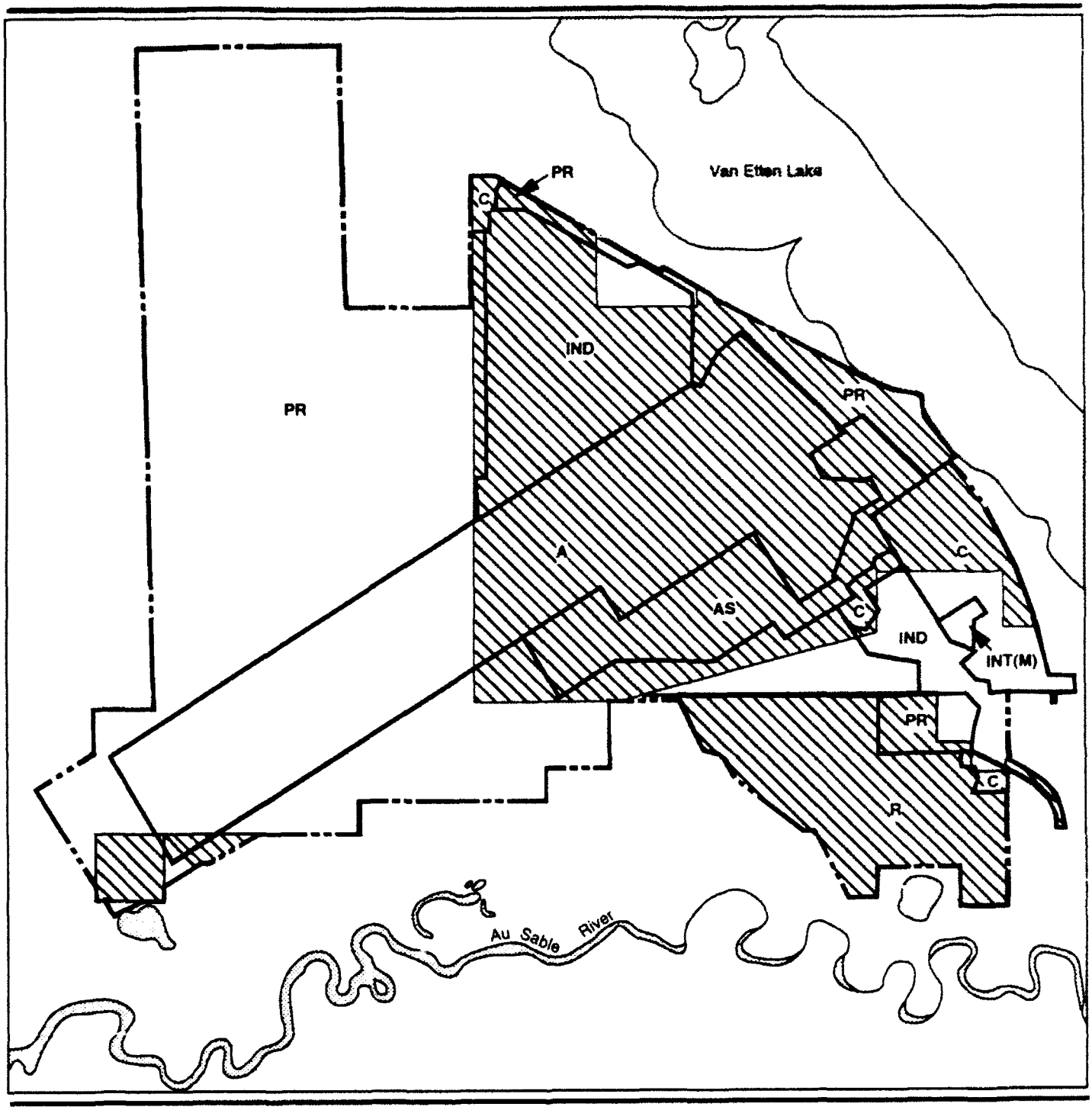
Land Use Category	P.A.	Alt. 1	Alt. 2
Airfield	65-75	N/A	N/A
Aviation support	65-75	N/A	N/A
Industrial	< 65	< 65	< 65
Institutional (medical/educational)	< 65	< 65	< 65
Commercial	< 65	< 65	< 65
Residential	< 65	< 65	< 65
Public/recreation	< 65	< 65	< 65

P.A. = Proposed Action.
Alt. 1 = Fire Training Alternative.
Alt. 2 = Recreation Alternative.

Table M-16. Biological Resource Impacts by Land Use Category, Wurtsmith AFB Reuse (Acres of Wetland Habitat Disturbed)[a]

Land Use Category	Proposed Action	Fire Training Alternative	Recreation Alternative
Airfield	0	0	0
Aviation support	0	0	0
Industrial	0	0	0
Institutional (medical)	0	0	0
Institutional (educational)	0	0	0
Commercial	0	0	0
Residential	0	0	0
Public facilities/recreation	69[b]	69[b,c,d]	69[b]
Total			

Notes: (a) Disturbance over the 1993-2013 period.
(b) Possible impact to the Massasauga rattlesnake (federal candidate for listing as threatened or endangered).
(c) Possible beneficial impacts to endangered Kirtland's warbler through habitat enhancement of the forest to the north.
(d) Possible mortality of the wood turtle in the forest to the north (Michigan State Species of Special Concern) through fire training activities.



EXPLANATION

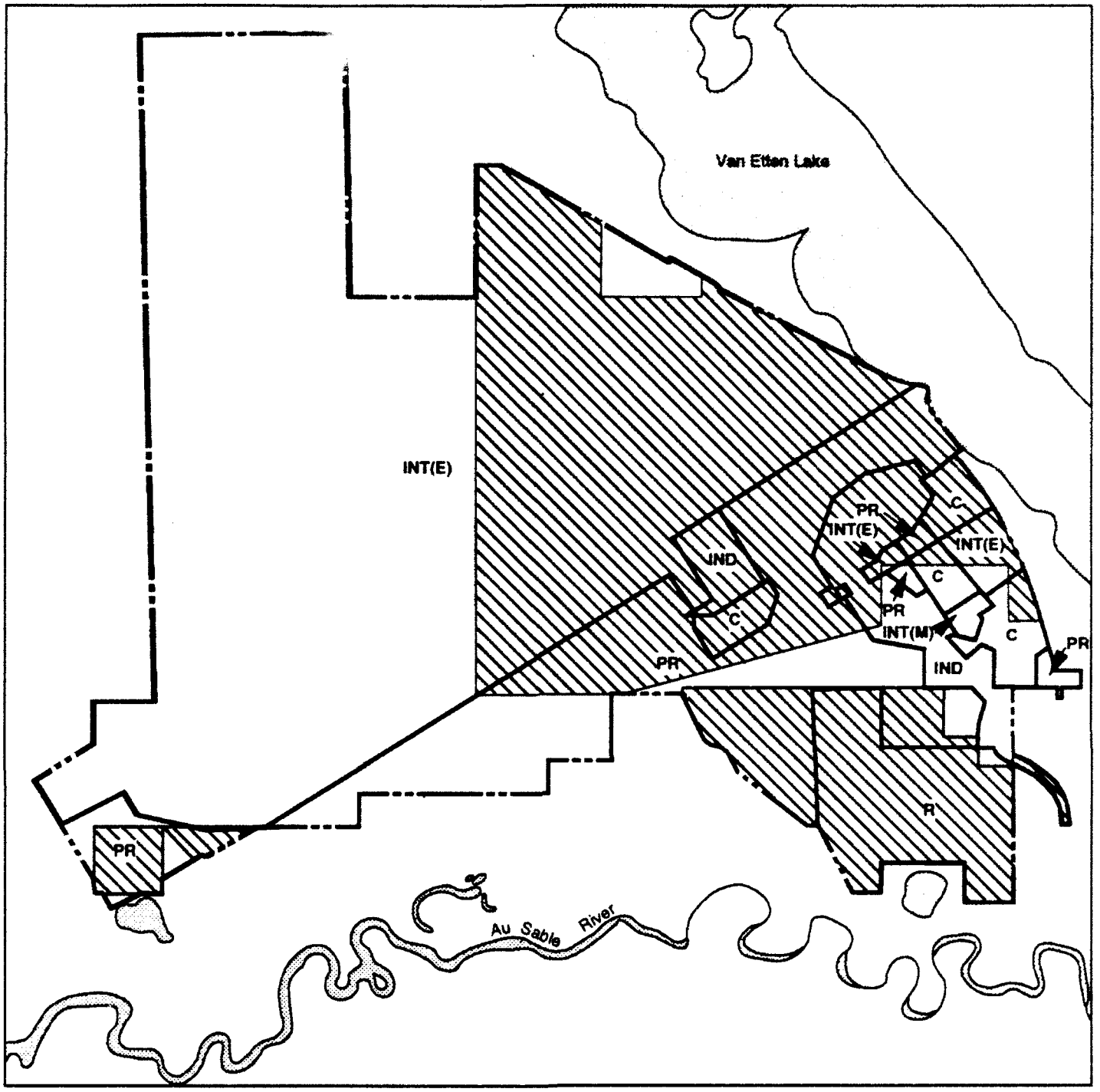
Base Boundary	
Air Force Fee-Owned	
A	Airfield - 1,025 ac.
AS	Aviation Support - 275 ac.
IND	Industrial - 489 ac.
INT(M)	Institutional (Medical) - 12 ac
INT(E)	Institutional (Education) *
C	Commercial - 216 ac.
R	Residential - 354 ac.
PR	Public/Recreation - 2,255 ac.

0 750 1500 3000 Feet

* Not Applicable

Land Use Parcels- Proposed Action

Figure M-1



EXPLANATION

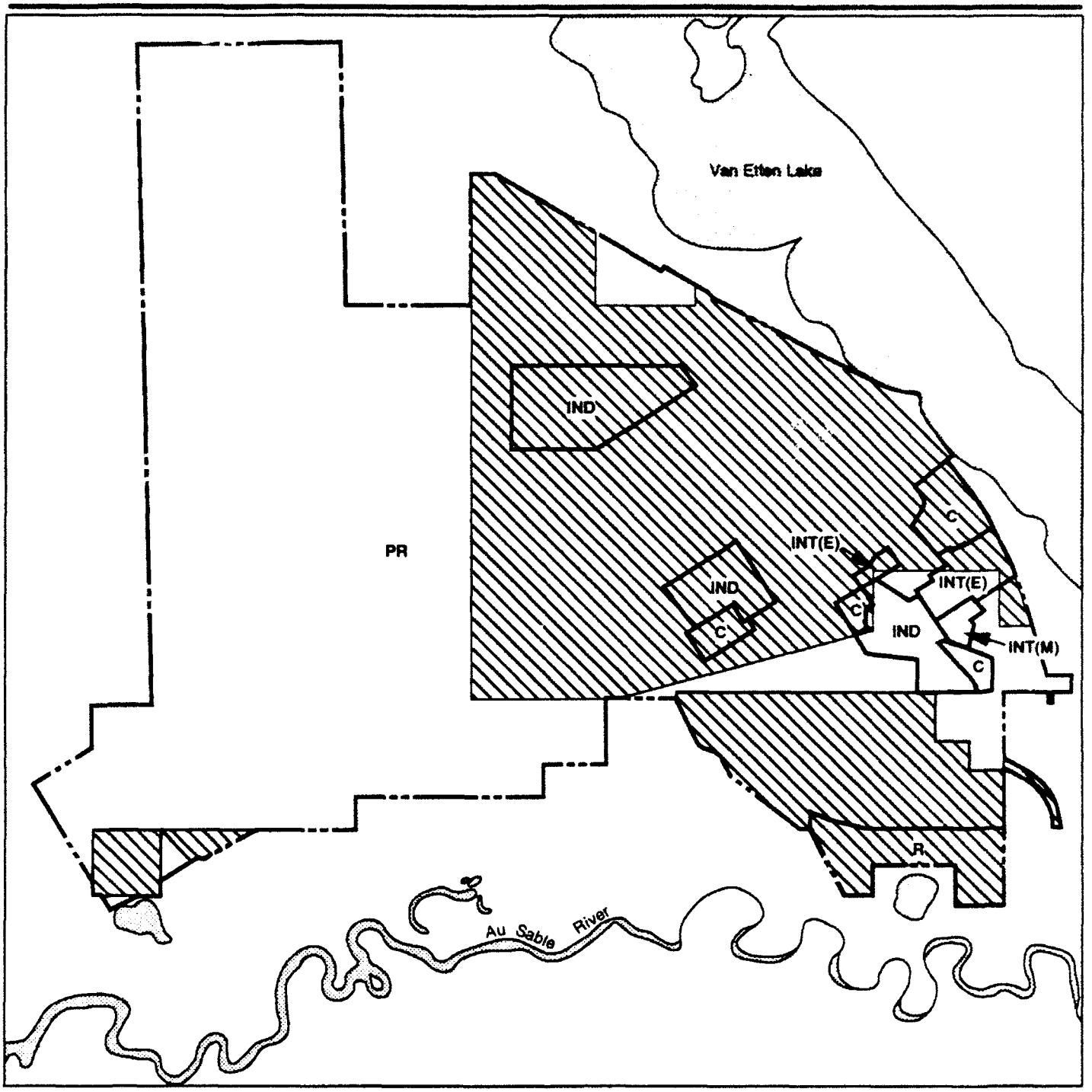
----	Base Boundary	INT(M)	Institutional (Medical) - 12 ac.
▨	Air Force Fee-Owned	INT(E)	Institutional (Education) - 3,115 ac.
A	Airfield *	C	Commercial - 130 ac.
AS	Aviation Support *	R	Residential - 250 ac.
IND	Industrial - 234 ac.	PR	Public/Recreation - 885 ac.

0 750 1500 3000 Feet

* Not Applicable

Land Use Parcels- Fire Training Alternative

Figure M-2



EXPLANATION

----	Base Boundary	INT(M)	Institutional (Medical) - 12 ac.
▨	Air Force Fee-Owned	INT(E)	Institutional (Education) - 48
A	Airfield *	C	Commercial - 62 ac.
AS	Aviation Support *	R	Residential - 92 ac.
IND	Industrial - 193 ac.	PR	Public/Recreation - 4,219 ac.

0 750 1500 3000 Feet

* Not Applicable

Land Use Parcels- Recreation Alternative

Figure M-3

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